

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

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**In re Application of:** **PHILYAW, Jeffry Jovan**

**Application Serial No.:** **09/642,891**                   **Confirmation No.:** **8887**

**Filing Date:** **August 21, 2000**

**Group:** **2161**

**Examiner:** **KANG, Paul H.**

**Title:** **RETRIEVING PERSONAL ACCOUNT INFORMATION  
FROM A WEB SITE BY READING A CREDIT CARD**

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**BRIEF ON APPEAL**

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- A. U.S. Patent Publication No. 2002/0016749 A1 to Borecki et al.

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- B. U.S. Patent No. 6,064,979 to Perkowski
- C. U.S. Patent No. 6,170,746 B1 to Brook et al.
- D. U.S. Patent No. 6,446,049 B1 to Janning et al.
- E. Entered Amendment dated November 20, 2006
- F. *Alza Corporation v. Mylan Laboratories, Inc.*, 464 F.3d 1286 (Fed. Cir. 2006)
- G. *Anderson's-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57 (1969)
- H. *Cable Elec. Prods., Inc. v. Genmark, Inc.*, 770 F.2d 1031 (Fed. Cir. 1985)
- I. *Cross Medical Products, Inc. v. Metronics Sofamore Danek, Inc.*, 424 F.3d 1293, 1323 (Fed. Cir. 2005)
- J. *Dann v. Johnston*, 425 U.S. at 219, 226, 96 S.Ct. 1393, 47 L.Ed 2d 692 (1976)
- K. *In re Bond*, 910 F.2d, 831, (Fed. Cir. 1990)
- L. *In re Clinton*, 527 F.2d 1226 (C.C.P.A. 1976)
- M. *In re Dembiczak*, 175 F.3d 994, 998 (Fed. Cir. 1999)
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- P. *In re Regel*, 526 F.2d, 1399 (C.C.P.A. 1975)
- Q. *In re Rouffett*, 149 F.3d 1350, 1357
- R. *KSR International Co. v. Teleflex Inc, et al.*, 127 S. Ct. 1727 (2007)
- S. *Medichem S.A. v. Rolabo, S.L.*, 437 F.3d 1157, 1165 (Fed. Cir 2006)
- T. *Sakraida v. AGPro, Inc.*, 425 U.S. 273 (1976)
- U. *United States v. Adams*, 383 U.S. 39, 40 (1966)

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**Title:** **RETRIEVING PERSONAL ACCOUNT INFORMATION  
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**APPELLANTS' MAIN BRIEF ON APPEAL**

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This Brief is submitted in accordance with 37 C.F.R. § 41.67 concerning the Notice of Appeal filed May 14, 2007 in response to the Final Office Action dated February 14, 2007, wherein the Examiner finally rejected claims 1-12 that comprise all of the pending claims in this application.

**I. Real Party Interest.**

The party in interest is LV Partners, L.P., a Texas limited partnership, whose general partner is LV GP, L.L.C., and whose principal office and place of business is at 2626 Cole Avenue, Dallas, Texas 75204.

**II. Related Appeals and Interferences.**

Appellants have the following related application pending appeals:

- U.S. Patent Application Serial No. 07/614,937, Appeal No. 2007-1745 entitled “LAUNCHING A WEB SITE USING A PASSIVE TRANSPONDER” (Atty. Dkt. No. PHLY-25,356), filed on July 11, 2000;

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- U.S. Patent Application Serial No. 09/494,924 entitled “INPUT DEVICE FOR ALLOWING INTERFACE TO A WEB SITE IN ASSOCIATION WITH A UNIQUE INPUT CODE” (Atty. Dkt. No. PHLY-24,913), filed on February 1, 2000;
- U.S. Patent Application Serial No. 09/382,374 entitled “METHOD AND APPARATUS FOR ALLOWING A BROADCAST TO REMOTELY CONTROL A COMPUTER” (Atty. Dkt. No. PHLY-24,736), filed on August 24, 1999;
- U.S. Patent Application Serial No. 09/417,863 entitled “SOFTWARE DOWNLOADING USING A TELEVISION BROADCAST CHANNEL” (Atty. Dkt. No. PHLY-24,767), filed on October 23, 1999;
- U.S. Patent Application Serial No. 09/382,423 entitled “METHOD AND APPARATUS FOR UTILIZING AN AUDIBLE SIGNAL TO INDUCE A USER TO SELECT AN E-COMMERCE FUNCTION” (Atty. Dkt. No. PHLY-24,739), filed on August 24, 1999;
- U.S. Patent Application Serial No. 09/602,034 entitled “CONTROLLING A PC USING A TONE FROM A CELLULAR TELEPHONE” (Atty. Dkt. No. PHLY-25,337), filed on June 23, 2000; and
- U.S. Patent Application Serial No. 09/659,520 entitled “LAUNCHING A WEB SITE USING A PERSONAL DEVICE” (Atty. Dkt. No. PHLY-25,355), filed on September 12, 2000.

Appellants have filed Notices of Appeal in the following related applications:

- U.S. Patent Application Serial No. 09/382,426 entitled “METHOD AND APPARATUS FOR LINKING A WEB BROWSER TO A PROMOTIONAL OFFER” (Atty. Dkt. No. PHLY-24,732), filed on August 24, 1999; and

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- U.S. Patent Application Serial No. 09/568,205 entitled “METHOD AND APPARATUS FOR UTILIZING A UNIQUE TRANSACTION CODE TO UPDATE A MAGAZINE SUBSCRIPTION OVER THE INTERNET” (Atty. Dkt. No. PHLY-24,914) filed on May 9, 2000.

The above-identified patent application has no related interferences.

### **III. Status of the Claims.**

Claims 1 – 12 from the application are pending, stand firmly rejected, and are on appeal here. A complete and current listing of Claims 1 – 12 are attached here in the **CLAIMS APPENDIX**.

### **IV. Status of Amendments.**

Appellants filed an Amendment and Response on November 20, 2006 in response to the Office Action, mailed May 18, 2006 which was entered; however, no amendments to the claims were presented. An amendment filed February 13, 2006 was the last Response entered that amended the Claims.

### **V. Summary of the Claimed Subject Matter.**

The present invention, as set forth currently in independent Claim 1, relates to a method of accessing personal account information of a credit card associated with a user over a global communication packet-switched network. The method comprises the step of, at a user location disposed on the network,<sup>1</sup> a machine-resolvable code (MRC) is resolved that has coded information contained therein which is disposed on the credit card of the user.<sup>2</sup> The coded information has no personal information contained therein relating to the user or routing information over a network.<sup>3</sup> The coded information, which is associated with routing information that is associated with both the personal account information of the user and a

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<sup>1</sup> See Specification Figure 27; Figure 34; page 46, lines 20-22; page 47, lines 11-17; page 55, lines 24-27; and page 56, line 1.

<sup>2</sup> See Specification Reference # 2500 on Figure 25; Specification Reference # 3402 on Figure 34; page 45, lines 12-22; page 47, lines 1-3; page 47, lines 6-9; page 55, lines 2-5; page 55, lines 10-17; and page 55, lines 19-24.

<sup>3</sup> See Specification page 47, lines 17-27; page 48, lines 1-4; page 49, lines 3-8; page 50, lines 18-27; page 51, lines 1-7; page 53, lines 5-17; page 54, lines 1-27; page 55, lines 10-27; page 56, lines 1-27; page 57, lines 10-12; page 57, lines 19-26; page 58, lines 7-23; page 58, lines 24-27; page 59, lines 1-12; and page 64, lines 15-24.

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specific and unique credit card company server that has stored thereat the personal account information of the user, is extracted from the MRC.<sup>4</sup> In response to the steps of resolving and extracting, the routing information is obtained to the credit card server associated with the extracted coded information.<sup>5</sup> Then, the user location is connected to the specific and unique credit card company server across the network over a determined route in accordance with the obtained routing information.<sup>6</sup> The extracted coded information is transmitted to the specific and unique credit card company server over the determined route during the step of connecting.<sup>7</sup> The transmitted coded information is used at the specific and unique credit card company server to determine the personal account information associated with the extracted coded information.<sup>8</sup> The determined personal account information is returned from the specific and unique credit card company server to the user location.<sup>9</sup> The determined personal account information is then presented to the user at the user location.<sup>10</sup>

The present invention, as set forth currently in dependent Claim 2, relates to the method of Claim 1, where the MRC is optical indicia.<sup>11</sup>

The present invention, as set forth currently in dependent Claim 3, relates to the method of Claim 2, where the optical indicia is a bar code.<sup>12</sup>

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<sup>4</sup> See Specification page 55, lines 10-27; page 56, lines 1-27; page 57, lines 10-12; page 57, lines 19-26; page 58, lines 7-23; page 58, lines 24-27; page 59, lines 1-12; and page 64, lines 15-24.

<sup>5</sup> See Specification page 55, lines 19-27; page 56, lines 1-27; page 57, lines 19-27; page 58, lines 1-6; page 58, lines 24-27; page 60, lines 1-18; page 61, lines 20-27; page 62, lines 5-23; page 63, lines 19-26; page 64, lines 1-7; and page 64, lines 15-24.

<sup>6</sup> See Specification page 56, lines 22-27; page 58, lines 4-6; page 59, lines 7-12; page 60, lines 19-24; page 61, lines 25-27; page 62, lines 20-27; page 63, lines 1-5; page 64, lines 6-7; and page 64, lines 22-24.

<sup>7</sup> See Specification page 56, lines 1-27; page 57, lines 4-18; page 58, lines 7-19; page 59, lines 7-12; page 60, lines 1-14; page 61, lines 25-27; page 62, lines 9-23; page 64, lines 1-7; page 64, lines 19-27; page 65, lines 1-27; and page 66, lines 1-9.

<sup>8</sup> See Specification page 56, lines 3-5; page 56, lines 22-27; page 57, lines 4-18; page 57, lines 25-27; page 58, lines 3-6; page 58, lines 16-23; page 59, lines 1-12; page 60, lines 5-14; page 62, lines 16-27; page 63, lines 5-11; page 64, lines 4-14; page 64, lines 22-24; page 65, lines 8-22; and page 66, lines 3-9.

<sup>9</sup> See Specification page 56, lines 3-5; page 56, lines 22-27; page 57, lines 4-18; page 57, lines 25-27; page 58, lines 3-6; page 58, lines 16-23; page 59, lines 1-12; page 60, lines 5-18; page 62, lines 16-27; page 63, lines 5-11; page 64, lines 6-10; page 64, lines 22-24; page 65, lines 19-22; and page 66, lines 3-6.

<sup>10</sup> See Specification page 56, lines 3-9; page 58, lines 16-23; page 59, lines 10-17; page 60, lines 5-14; page 63, lines 5-11; page 64, lines 10-12; page 65, lines 19-22; and page 66, lines 3-6.

<sup>11</sup> See Specification Reference # 3402 on Figure 34; page 55, lines 11-14; page 59, lines 21-23; page 73, lines 25-28; page 75, lines 12-16; and original Claim 2.

<sup>12</sup> See Specification Reference # 3402 on Figure 34; page 55, lines 11-14; page 59, lines 21-23; page 73, lines 25-28; page 75, lines 12-16; and original Claim 3.

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The present invention, as set forth currently in dependent Claim 4, relates to the method of Claim 1, where the routing information in the step of obtaining is stored on a user computer at the user location such that the coded information in the step of extracting is used to obtain the corresponding routing information from the user computer.<sup>13</sup>

The present invention, as set forth currently in dependent Claim 5, relates to the method of Claim 4, where the user computer stores a plurality of coded information each associated with unique routing information such that reading of the MRC of a select one of one or more credit cards of the user causes the user computer to connect to the corresponding specific and unique credit card company server over the network.<sup>14</sup>

The present invention, as set forth currently in dependent Claim 6, relates to the method of Claim 1, where the step of resolving utilizes a reading device which is a wireless scanner that transmits the coded information to a user computer at the user location via a receiving device operatively connected to the user computer.<sup>15</sup>

The present invention, as set forth currently in dependent Claim 7, relates to the method of Claim 1, where personal account information in the step of presenting is displayed on a computer display operatively connected to a user computer at the user location.<sup>16</sup>

The present invention, as set forth currently in dependent Claim 8, relates to the method of Claim 1, where the routing information in the step of obtaining comprises a network address of the specific and unique credit card company server on the network and file path information which locates the personal account information of the user on the specific and unique credit card company server.<sup>17</sup>

The present invention, as set forth currently in independent Claim 9, relates to a method for accessing personal information from a remote location on a network. At a user location on

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<sup>13</sup> See Specification page 55, lines 19-24; and page 56, lines 14-27; page 58, lines 9-12; and original Claim 4.

<sup>14</sup> See Specification page 57, lines 1-18; and page 59, lines 24-27; page 60, lines 1-24; and page 61, lines 20-27; and original Claim 5.

<sup>15</sup> See Specification Reference #3410 on Figure 34; page 57, lines 19-25; and original Claim 6.

<sup>16</sup> See Specification Reference #1612 on Figure 16; page 56, lines 3-5; page 58, lines 16-19; page 59, lines 10-12; page 61, lines 9-11; page 63, lines 8-11; and page 64, lines 10-12.

<sup>17</sup> See Specification page 55, lines 19-27; page 56, lines 1-27; page 57, lines 25-27; page 58, lines 1-9; page 59, lines 1-10; page 60, lines 14-18; page 61, lines 20-27; page 62, lines 9-27; page 64, lines 4-10; and page 64, lines 20-24.

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the network,<sup>18</sup> a unique information access code that disposed on a portable access device that is carried by a user is read.<sup>19</sup> The unique information access code is uniquely associated with both routing information on the network to the remote location and with personal information at the remote location of a user that is associated with the portable access device.<sup>20</sup> The association of the remote location with the unique information access code is unique to such unique information access code such that only that single remote location contains the associated personal information.<sup>21</sup> Routing information is obtained from a database by comparing the unique information access code in a matching operation to a record in the database to determine if there exists in the record a pre-association between the unique information access code and at least one routing information.<sup>22</sup> If so, then access is allowed to such matching routing information.<sup>23</sup> A remote location is accessed in accordance with the obtained routing information.<sup>24</sup> The unique information access code is transmitted to the remote location.<sup>25</sup> The unique information access code is then received at the remote location, and personal information associated therewith is accessed and forwarded back to the user location for viewing by the user.<sup>26</sup> In forwarding the forwarded information, a request for personal identification is first sent from the remote location after it is determined that there is personal information associated with the unique information access code contained in the database local to the remote location.<sup>27</sup>

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<sup>18</sup> See Specification Figure 27; Figure 34; page 46, lines 20-22; page 47, lines 11-17; page 55, lines 24-27; and page 56, line 1.

<sup>19</sup> See Specification Reference # 2500 on Figure 25; Specification Reference # 3402 on Figure 34; page 45, lines 12-22; page 47, lines 1-3; page 47, lines 6-9; page 55, lines 2-5; and page 55, lines 10-17.

<sup>20</sup> See Specification page 55, lines 19-24; page 56, lines 1-27; page 57, lines 1-17; page 57, lines 24-28; page 58, lines 1-23; page 59, lines 1-12; page 62, lines 5-27; and page 64, lines 15-24.

<sup>21</sup> See Specification page 57, lines 1-17; page 57, lines 24-28; page 58, lines 1-23; page 59, lines 1-12; page 60, lines 19-24; page 61, lines 20-27; page 64, lines 1-10; page 64, lines 20-27; page 65, lines 1-27; and page 66, lines 1-6.

<sup>22</sup> See Specification page 56, lines 1-2; page 56, lines 22-27; page 57, lines 27-28; page 58, lines 1-6; page 61, lines 20-27; page 62, lines 9-14; page 64, lines 1-7; page 64, lines 19-20; page 65, lines 15-17; page 65, lines 26-27; page 66, lines 1-2; and page 67, lines 1-4.

<sup>23</sup> See Specification page 56, lines 1-5; page 56, lines 22-27; page 57, lines 27-28; page 58, lines 1-6; page 61, lines 20-27; page 62, lines 1-4; page 62, lines 16-18; page 64, lines 4-7; page 64, lines 20-24; page 65, lines 18-22; page 66, lines 2-3; and page 67, lines 3-4.

<sup>24</sup> See Specification page 55, lines 24-27; page 56, lines 1-5; page 56, lines 22-27; page 58, lines 1-5; page 58, lines 9-19; page 59, lines 7-10; page 60, lines 1-18; page 61, lines 25-27; page 62, lines 18-23; page 63, lines 3-5; page 63, lines 17-26; page 64, lines 6-7; page 64, lines 22-24; page 65, lines 3-7; page 65, lines 9-19; and page 66, lines 1-3.

<sup>25</sup> See Specification page 56, lines 1-5; page 56, lines 22-27; page 58, lines 7-16; page 59, lines 1-4; page 62, lines 23-27; page 64, lines 1-7; page 64, lines 19-27; page 65, lines 1-27; and page 66, lines 1-9.

<sup>26</sup> See Specification page 56, lines 3-9; page 58, lines 7-19; page 59, lines 1-4; page 60, lines 5-14; page 62, lines 23-27; page 63, lines 5-11; page 64, lines 10-12; page 65, lines 19-22; and page 66, lines 3-6.

<sup>27</sup> See Specification page 58, lines 19-23; page 63, lines 8-12; page 64, lines 10-14, page 66, lines 7-8; and pag e68, lines 1-4.

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Then, the personal identification information is entered at the user location.<sup>28</sup> In response to input of personal identification information by the user, the personal information is returned to the user location.<sup>29</sup>

The present invention, as set forth currently in dependent Claim 10, relates to the method of Claim 9, where the network is a global communication network.<sup>30</sup>

The present invention, as set forth currently in dependent Claim 11, relates to the method of Claim 9, where the portable access device comprises a card that is typically utilized for credit transactions.<sup>31</sup>

The present invention, as set forth currently in dependent Claim 12, relates to the method of Claim 9, where the steps of obtaining and accessing comprises the steps of first, in response to the step of reading, accessing an intermediate location on the network remote from the user location.<sup>32</sup> Then, transmitting the unique information access code to the intermediate location from the user location.<sup>33</sup> The intermediate location has contained thereat the database with associations between a plurality of unique information access codes and associated unique routing information to associated remote locations on the network.<sup>34</sup> Then, comparing the received unique information access code with the stored unique information access codes. If a match is found, then returning the matched unique routing information to the user location.<sup>35</sup>

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<sup>28</sup> See Specification page 58, lines 19-23; page 61, lines 12-15; page 63, lines 8-12; page 64, lines 10-14, page 66, lines 7-9; and page 68, lines 1-2.

<sup>29</sup> See Specification page 58, lines 16-23; page 63, lines 8-12; page 64, lines 10-14, and page 66, lines 3-8.

<sup>30</sup> See Specification, Reference # 306 on Figure 34; page 15, lines 1-3; page 55, lines 24-27; page 56, lines 1-5; page 57, lines 4-7; page 58, lines 12-19; page 59, lines 7-10; page 59, lines 17-21; page 60, lines 11-14; page 60, lines 25-27; page 62, lines 1-4; page 63, lines 5-7; page 63, lines 14-26; page 64, lines 4-27; page 65, lines 3-7; page 67, lines 3-4; page 74, lines 25-27; page 75, lines 1-2; and page 76, lines 4-5.

<sup>31</sup> See Specification Reference # 2500 on Figure 25; Specification Reference # 3402 on Figure 34; page 45, lines 12-22; page 47, lines 1-3; page 47, lines 6-9; page 55, lines 2-5; and page 55, lines 10-17.

<sup>32</sup> See Specification page 63, lines 14-26; page 64, lines 17-19; and page 65, lines 1-3.

<sup>33</sup> See Specification page 64, lines 1-4; page 64, lines 16-20; and page 65, lines 9-17; page 65, lines 24-27 and page 66, lines 25-27.

<sup>34</sup> See Specification page 64, lines 1-7; page 64, lines 19-21; and page 65, lines 3-7; page 65, lines 15-19; and page 65, lines 26-27.

<sup>35</sup> See Specification page 64, lines 1-7; page 64, lines 19-21; and page 65, lines 3-7; page 65, lines 15-19; page 65, lines 26-27 and page 67, lines 1-3.

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Finally, utilizing the returned unique routing information from the intermediate location to access the remote location.<sup>36</sup>

## **VI. Grounds of Rejection to be Reviewed on Appeal.**

Claims 1-5, and 7-12 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Publication No. 2002/0016749 A1 to Borecki et al. (“*Borecki*”) in view of U.S. Patent No. 6,064,979 to Perkowski (“*Perkowski*”). Claim 6 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over *Borecki-Perkowski*, as applied to Claims 1-5 and 7-12, and further in view of U.S. Patent No. 6,170,746 to Brook et al. (“*Brook*”). Claims 1 and 9 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Perkowski* in view of U.S. Patent No. 6,446,049 to Janning et al. (“*Janning*”).

As detailed below, the Examiner has improperly applied the combination of *Borecki-Perkowski* to Claims 1-5 and 7-12; *Borecki-Perkowski-Brook* to Claim 6; and *Perkowski-Janning* to Claims 1 and 9. Specifically, Appellants submit that the §103 rejections based on the respective combinations are not proper and are without basis, and that the Examiner has failed to state a *prima facie* case as to the combination constituting a viable combination of references under 35 U.S.C. § 103.

## **VII. Argument and Discussion.**

In order to prevail, Appellants must show that the Examiner has improperly combined the references in support of the 35 U.S.C. § 103 rejection. As such, a brief discussion of the relevant rules and recent court decisions affecting a proper rejection under 35 U.S.C. § 103 follows.

### **A. Rejections under 35 U.S.C. §103**

MPEP § 2142 specifies that:

The examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness.

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<sup>36</sup> See Specification page 64, lines 4-10; page 64, lines 19-24; and page 65, lines 3-7; page 65, lines 18-22; page 66, lines 2-9; page 67, lines 3-4; and page 67, lines 7-20.

In regard to what an examiner must show in order to establish a *prima facie* case of obviousness, MPEP § 2142 further explains that:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. . . . Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

In regard to what an examiner must do in order to meet the first criterion for a *prima facie* rejection, MPEP § 2143.01 specifies that:

Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art.

In the present application, the various combinations of references proposed by the Examiner are not supported by a proper suggestion or motivation to make each proposed modification. This means that the first criterion for a *prima facie* rejection has not been met, which in turn means the Examiner has failed to carry the burden of establishing a *prima facie* rejection. In addition, certain claim limitations are not taught or suggested by the cited combinations, which means that the third criterion for a *prima facie* rejection has not been met, and that the Examiner has further failed to carry the burden of establishing a *prima facie* rejection for this independent reason. Further, the Examiner has failed to put forth any arguments and has not provided any articulated reasoning as to how any deficiency (missing element) could be solved in a predictable manner through combination with any other reference.

## **B. Recent Decisions Affecting a Finding of Obviousness.**

### **1. In re Kahn.**

With respect to obviousness, a claimed invention is unpatentable if the differences between it and the prior art are “such that the subject matter as a whole would have been obvious

at the time the invention was made to a person having ordinary skill in the art.”<sup>37</sup> Obviousness is a question of law, based upon underlying factual questions which are reviewed for clear error following a bench trial. These “underlying factual inquiries include: (1) The scope and content of the prior art; (2) The level of ordinary skill in the prior art; (3) The difference between the claimed invention and the prior art; and (4) Objective evidence of nonobviousness.”<sup>38</sup>

In *Kahn* the Court noted that:

“. . . to reject claims in an Application under § 103, an Examiner must show an unrebutted *prima facie* case of obviousness . . . on appeal to the board, an Applicant can overcome a rejection by showing insufficient evidence of a *prima facie* obviousness or by rebutting the *prima facie* case with evidence of secondary indicia of nonobviousness.”<sup>39</sup>

When combining references, it is well recognized that “[m]ost inventions arise from a combination of old elements and each element may often be found in the prior art.”<sup>40</sup> “However, mere identification in the prior art of each element is insufficient to defeat the patentability of the combined subject matter as a whole.”<sup>41</sup> *Kahn* further states:

Rather, to establish a *prima facie* case of obviousness based on a combination of elements disclosed in the prior art, the Board must articulate the basis on which it concludes that it would have been obvious to make the claimed invention. *Id.* In practice, this requires that the Board “explain the reasons one of the ordinary skill in the art would have been motivated to select the references and to combine them to render the claimed invention obvious.” *Id.* at 1357-59. This entails consideration of both the “scope and content of the prior art” and the “level of ordinary skill in the pertinent art” aspects of the Graham test.<sup>42</sup>

The primary test that has been put forth by the Federal Circuit is the teaching-suggestion-motivation test. *Kahn* set forth that, when there is no explanation provided by the Board to explain the motivation, or the suggestion or the teaching, that would have led a skilled artisan at

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<sup>37</sup> 35 U.S.C. § 103(a) (2000); *In re Kahn*, 441 F.3d 977, 985 (Fed. Cir. 2006) (citing *Graham v. John Deere Co.*, 383 U.S.1, 13-14, 86 S.Ct. 684, 15L, Ed. 2d 545, 1962)

<sup>38</sup> *In re Dembiczak*, 175 F.3d 994, 998 (Fed. Cir. 1999).

<sup>39</sup> *Kahn*, 441 F.3d at 985

<sup>40</sup> *In re Rouffett*, 149 F.3d 1350, 1357

<sup>41</sup> *Kahn*, 441 F.3d at 986, citing *Rouffett*, 149 F.3d at 1355, 1357

<sup>42</sup> *Kahn*, 441 F.3d at 987

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the time of the invention to the claimed combination as a whole, then the court would infer that hindsight was utilized to conclude that the invention was obvious. *Kahn* relied upon the *Rouffett* case for this teaching at 1358. The “teaching-suggestion-motivation” requirement was set forth to protect against the entry of hindsight into the obviousness analysis, a problem which §103 was meant to confront. Thus, in order to establish a *prima facie* case, some explanation as to teaching, suggestion, or motivation of each of the references and how they can be combined is required.

Although *Kahn* sets forth the teaching-suggestion-motivation test, there is still the “analogous-art” test that must be applied, this being one test that was articulated by the Supreme Court as part of the *Graham* analysis.<sup>43</sup> “The analogous-art test requires that the Board show a reference is either in the field of the Applicant’s endeavor or is reasonably pertinent as to the problem with which the inventor was concerned in order to rely on that reference as a basis for rejection.”<sup>44</sup> The following was further stated by *Kahn*:

References are selected as being reasonably pertinent to the problem based on the judgment of a person having ordinary skill in the art. *Id.* (“It is necessary to consider the reality of the circumstances, in other words, common sense--in deciding in which fields a person of ordinary skill would reasonably be expected to look for a solution to the problem facing the inventor.” (quoting *In re Wood*, 599 F.2d 1032, 1036 (C.C.P.A. 1979))). We have explained that this test begins the inquiry into whether a skilled artisan would have been motivated to combine references by defining the prior art relevant for the obviousness determination, and that it is meant to defend against hindsight. See *id.*; *In re Clay*, 996 F.2d 656, 659-60 (Fed. Cir. 1992).<sup>45</sup>

As such, the first step of analyzing the combination provided by the Examiner is to examine the references and determine if the combination satisfies the analogous-art test. The next step for determining obviousness is to analyze the teaching-suggestion-motivation test which:

. . . picks up where the analogous art test leaves off and informs the Graham analysis. To reach a non-hindsight driven conclusion as to whether a person having ordinary skill in the art at the time of the

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<sup>43</sup> See *Dann v. Johnston*, 425 U.S. at 219, 226, 96 S.Ct. 1393, 47 L.Ed 2d 692 (1976).

<sup>44</sup> *Kahn*, 441 F.3d at 987.

<sup>45</sup> *Id*

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invention would have viewed the subject matter as a whole to have been obvious in view of multiple references, the Board must provide some rationale, articulation, [\*\*23] or reasoned basis to explain why the conclusion of obviousness is correct. The requirement of such an explanation is consistent with governing obviousness law, see § 103(a); *Graham*, 383 U.S. at 35; *Dann*, 425 U.S. at 227-29, and helps ensure predictable patentability determinations.<sup>46</sup>

Even if all of the elements of a claim are disclosed in various prior art references, the long-standing rule that a claimed invention, as a whole<sup>47</sup>, cannot be said to be obvious unless there is some reason or motivation given in prior art why someone would have been prompted to combine the teachings or the references.<sup>48</sup> The prior art itself may suggest desirability of a combination, or the motivation may come from other sources (for example, economic factors).<sup>49</sup> Thus, the motivation to combine the relevant art or teachings does not have to be found explicitly in the prior art but, rather, can be implicit thereto. “However, rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.”<sup>50</sup><sup>51</sup> The purpose of such requirement is to ensure “due process and non-arbitrary decision making”, as it is in § 103.<sup>52</sup>

*Kahn* articulated the considerations for motivation when analyzing obviousness. The Court stated “the problem examined is not the specific problem solved by the invention, but the general problem that confronted the inventor before the invention was made.”<sup>53</sup> In the reference in *Cross*, the quote that was cited by the Court<sup>54</sup> was that “one of ordinary skill in the art need not see the identical problem addressed in the prior art reference to be motivated to apply its teachings.” As to motivation, the Courts upheld that the evidence of motivation to combine the

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<sup>46</sup> *Id.*

<sup>47</sup> *In re Hiraro*, 535 F.2d, 67, (C.C.P.A. 1966).

<sup>48</sup> *In re Regel*, 526 F.2d, 1399 (C.C.P.A. 1975); *In re Bond*, 910 F.2d, 831, (Fed. Cir. 1990).

<sup>49</sup> See e.g. *In re Clinton*, 527 F.2d 1226 (C.C.P.A. 1976); *Cable Elec. Prods., Inc. v. Genmart, Inc.*, 77 F.2d, 1015 (Fed. Cir. 1985).

<sup>50</sup> *Kahn*, 441 F.3d at 998 referring to *Lee*, 277, F.3d at 1343-46 and *Rouffett*, 149 F.3d at 1355-59.

<sup>51</sup> It is noted that the Supreme Court in the recently decided case, *KSR International Co. v. Teleflex Inc, et al.*, 127 S. Ct. 1727 (2007) cited this specific language at page 1741 therein.

<sup>52</sup> *Kahn*, 441 F.3d at 998 referring to *Lee*, 277, F.3d at 1343-46 and *Rouffett*, 149 F.3d at 1355-59.

<sup>53</sup> *Kahn*, 441 F.3d at 988, referring to *Cross Medical Products, Inc. v. Metronics Sofamore Danek, Inc.*, 424 F.3d 1293, 1323 (Fed. Cir. 2005).

<sup>54</sup> *Cross*, 424 F.3d at 1323.

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prior art references “may flow from the prior art references themselves, knowledge of one of ordinary skill in the art, or, in some cases, from the nature of the problem to be solved.”<sup>55</sup> Kahn summarized the motivation-suggestion-teaching test as follows:

Therefore, the “motivation-suggestion-teaching” test asks not merely what the references disclose, but whether a person of ordinary skill in the art, possessed with the understandings and knowledge reflected in the prior art, and motivated by the general problem facing the inventor, would have been led to make the combination recited in the claims. See *Cross Med. Prods.*, 424 F.3d at 1321-24. From this it may be determined whether [\*\*26] the overall disclosures, teachings, and suggestions of the prior art, and the level of skill in the art—i.e., the understandings and the knowledge of persons having ordinary skill in the art at the time of the invention—support the legal conclusions of obviousness. See *Princeton Biochemicals*, 411 F.3d at 1338 (pointing to evidence supplying detailed analysis of the prior art and the reasons one of ordinary skill would have possessed the knowledge and motivation to combine).<sup>56</sup>

In *Alza Corporation v. Mylan Laboratories, Inc.*, 464 F.3d 1286 (Fed. Cir. 2006), the Federal Circuit has responded to arguments made during pendency of the recently decided Supreme Court case, *KSR International Co v. Teleflex Inc, et al.*, 127 S. Ct. 1727 (2007), and has spelled out its law on obviousness, insisting that it is in harmony with Supreme Court precedent.

In the facts of this case, Alza sued Mylan for infringement of its patent (6,124,355) under 35 U.S.C. §271(e)(2) after Mylan sought FDA approval to market a generic version of oxybutynin, a drug used to treat urinary incontinence. The Federal Circuit affirmed the obviousness and non-infringement decisions of the district court.

In the process, Judge Arthur Gajarsa dedicated five pages of his opinion to then outline the Federal Circuit’s law on obviousness, responding to many arguments made in the then pending Supreme Court case of *KSR Int’l Co. v. Teleflex, Inc.* (U.S. No. 04-1350). KSR and many amici, including the U.S. government, have challenged the Federal Circuit rule that proof of obviousness must include a showing of a “teaching, suggestion, or motivation” to combine the

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<sup>55</sup> *Medichem S.A. v. Rolabo, S.L.*, 437 F.3d 1157, 1165 (Fed. Cir 2006), quoting *Brown and Williamson Tobacco Corp. v. Phillip Morris, Inc.*, 229 F.3d, 1120, 1125 (Fed. Cir. 2000).

<sup>56</sup> Kahn, 441 F.3d at 988.

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prior art elements of the claimed invention. *KSR* and others have said that this requirement is too rigid and is inconsistent with Supreme Court decisions issued since *Graham v. John Deere Co.*, 383 U.S. 1 (1966).

Judge Gajarsa wrote the following in his *Alza* opinion:

This requirement has been developed consistent with the Supreme Court's obviousness jurisprudence as expressed in *Graham* and the text of the obviousness statute that directs us to conduct the obviousness inquiry "at the time the invention was made" 35 U.S.C. §103. As we explained in [*In re Kahn*, 441 F.3d 977 (Fed. Cir. 2006)],

The motivation-suggestion-teaching test picks up where the analogous art test leaves off and informs the *Graham* analysis. To reach a non-hindsight driven conclusion as to whether a person having ordinary skill in the art at the time of the invention would have viewed the subject matter as a whole to have been obvious in view of multiple references, the Board must provide some rationale, articulation, or reasoned basis to explain why the conclusion of obviousness is correct. The requirement of such an explanation is consistent with governing obviousness law . . .

441 F.3d at 987. We further explained that the "motivation to combine" requirement "[e]ntails consideration of both the 'scope and content of the prior art' and 'level of ordinary skill in the pertinent art' aspects of the *Graham* test." *Id.* at 986.

At its core, our anti-hindsight jurisprudence is a test that rests on the unremarkable premise that legal determinations of obviousness, as with such determinations generally, should be based on evidence rather than on mere speculation or conjecture. Our court's analysis in *Kahn* bears repeating:

A suggestion, teaching, or motivation to combine the relevant prior art teachings *does not have to be found explicitly in the prior art*, as "the teaching, motivation, or suggestion may be implicit from the prior art as a whole, rather than expressly stated in the references.... The test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art." However, rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be *some* articulated reasoning with *some* rational underpinning to support the legal conclusion of obviousness. This requirement is as much rooted in the Administrative Procedure Act [for our review of Board

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determinations], which ensures due process and non-arbitrary decision making, as it is in § 103.

441 F.3d at 987-88 (quoting *In re Kotzab*, 217 F.3d 1365, 1370 (Fed. Cir. 2000)) (citations omitted) (emphases added). There is flexibility in our obviousness jurisprudence because a motivation may be found *implicitly* in the prior art. We do not have a rigid test that requires an actual teaching to combine before concluding that one of ordinary skill in the art would know to combine references. This approach, moreover, does not exist merely in theory but in practice, as well. Our recent decisions in *Kahn* and in [*Cross Med. Prods., Inc., v. Medtronic Sofamor Danek, Inc.*, 424 F.3d 1293 (Fed. Cir. 2005)] amply illustrate the current state of this court’s views.<sup>57</sup>

## 2. KSR

The recently issued Supreme Court Case in *KSR* held that the Federal Circuit’s Teaching, Suggestion or Motivation (TSM) test to combine known elements in order to show that the combination is obvious is too rigid. The Court reinforced their position that analysis under *Graham* has been reaffirmed. The Court indicated that its holding was that a “patent for a combination which only unites old elements with no change in their respective functions . . . obviously withdraws what is already known into the field of its monopoly and diminishes the resources available to skillful men.”<sup>58</sup> The Court stated that this was a “principal reason for declining to allow patents for what is obvious. The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.”<sup>59</sup> The Court further went on to indicate that there were three cases that illustrated the application of this doctrine of predictability. The first case was *United States v. Adams*, 383 U.S. 39, 40 (1966). In discussing this case, the Court noted that it had “relied upon the corollary principal that when the prior art teaches away from combining certain known elements, discovery of a successful means of combining them is more likely to be non-obvious.”<sup>60</sup> In the second case, *Anderson’s-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57 (1969), the Court reiterated “while the combination of old elements performed a useful function, it added nothing to the nature and quality of the radiant-heat burner already patented.”<sup>61</sup> In the third case, *Sakraida v.*

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<sup>57</sup> *Alza Corporation v. Mylan Laboratories, Inc.*, 464 F.3d 1286, 1290 (Fed. Cir. 2006).

<sup>58</sup> *KSR*, 127 S. Ct. 1727, 1739 (2007), Citing *Great Atlantic & Pacific Co. v. Supermarket Equipment Corp.*, 340 U.S. 147, 152 (1950).

<sup>59</sup> *KSR*, 127 S. Ct. at 1739.

<sup>60</sup> *Id.* at page 1740.

<sup>61</sup> *Id.*

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*AGPro, Inc.*, 425 U.S. 273 (1976), the Court stated that “when a patent ‘simply arranges old elements with each performing the same function it had been known to perform’ and yields no more than one would expect from such an arrangement, the combination is obvious.”<sup>62</sup>

The Court summarized these three cases as follows:

The principles underlying these cases are instructive when the question is whether a patent claiming the combination of elements of prior art is obvious. When a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. *If a person of ordinary skill can implement a predictable variation, §103 likely bars its patentability.* For the same reason, if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill. *Sakraida* and *Anderson’s-Black Rock* are illustrative-a court must ask whether the improvement is more than the predictable use of prior art elements according to their established functions.<sup>63</sup> (Emphasis added.)

The Court recognized that following the above stated principals might involve more than “the simple substitution of one known element for another or the mere application of a known technique to a piece of prior art ready for the improvement.”<sup>64</sup> The Court noted that it might “be necessary for a Court to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent that issued.”<sup>65</sup> However, the Court also noted that the analysis should be “made explicit” citing *Kahn* wherein it stated that “rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead there must be some articulated reason with some rational underpinning to support the legal conclusion of obviousness.”<sup>66</sup> The Court noted that, however, “the analysis need not seek out precise teachings directed to the specific subject matter of the

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<sup>62</sup> KSR, 127 S. Ct at page 1740 Citing *Sakradia* at 282.

<sup>63</sup> *Id.* at page 1741.

<sup>64</sup> KSR, 127 S. Ct. at page 1741.

<sup>65</sup> *Id.* at page 1741

<sup>66</sup> *Id.*

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challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.”<sup>67</sup>

Although the Court in this opinion rejected the rigidity of the TSM test, there was some reference to the decision in *Alza* wherein the Court noted the Federal Circuit’s position that “there is flexibility in our obviousness jurisprudence because the motivation may be found *implicitly* in the prior art. We do not have a rigid test that requires an actual teaching to combine . . . ,” citing *Alza*, 464 F.3d at 1291.<sup>68</sup> However, the Court also noted that the *Alza* decision was not before it and that, although they may describe an analysis more consistent with the Court’s earlier precedence, the Court of Appeals would have to consider the current decision in view of its future cases.

### C. 35 U.S.C § 103 Rejection in the Application on Appeal.

Summary of Rejection:

- Claims 1-5 and 7-12 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Borecki* in view of *Perkowski*.
- Claim 6 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over *Borecki-Perkowski* as applied to Claims 1-5 and 7-12, further in view of *Brook*.
- Claims 1 & 9 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of *Perkowski* in view of *Janning*.

Regarding Claims 1-5 and 7-12, the Examiner states in the Final Office Action dated October 5, 2006:<sup>69</sup>

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have incorporated the automated data entry and data locating system, as taught by *Perkowski*, into the credit card account information retrieval system of *Borecki*, for the purpose of enhancing the user friendliness of the system by automating manual data entry and automatically retrieving credit card information.

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<sup>67</sup> *Id.*

<sup>68</sup> *Id.* at page 1743.

<sup>69</sup> See Final Office Action dated October 5, 2006, at page 4.

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Regarding Claim 6, the Examiner states in the Final Office Action dated October 5, 2006:<sup>70</sup>

As to claim 6, Borecki-Perkowski teach (*sic*) the invention substantially as claimed. However, Borecki-Perkowski does not explicitly teach a wireless scanner. In the same field of endeavor, Brook teaches a wireless barcode scanner (Brook, figure 1 and col. 3, line 6 - col. 4, line 4 1). It would have been obvious to one having ordinary skill in the art at the time the invention was made to have incorporated the wireless barcode scanner, as taught by Brook, into the system of Borecki-Perkowski, for the purpose of increasing user convenience and mobility.

Regarding Claims 1 and 9, the Examiner states in the Final Office Action dated October 5, 2006:<sup>71</sup>

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have incorporated the credit card access system of Janning into the automated information access system of Perkowski for the purpose of easily and efficiently obtaining user's credit information while maintaining anonymity as well as convenience.

The Examiner stated in the Final Office Action dated February 14, 2007:

As to claim 1, Borecki teaches the invention substantially as claimed. Borecki teaches a system and method of accessing personal account information of a credit card associated with a user over a global communication packet-switched network, comprising the steps of:

connecting a user location to the specific and unique credit card company server across the network in accordance with a known URL (Borecki, Figure 2A and page 2, paragraph 0034-0035);

transmitting the account information to the specific and unique credit card company server over the network (Borecki, Figure 2A and page 2, paragraph 0034-0035 and page 3, paragraph 0039);

using customer account information at the specific and unique credit card company server to determine the personal account information associated with the customer account information from the credit card company server, to the user location (Borecki, page 3, paragraph 0040); and

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<sup>70</sup> See Final Office Action dated October 5, 2006, at page 4.

<sup>71</sup> See Final Office Action dated October 5, 2006, at page 4.

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presenting the information to the user at the user location (Borecki, page 2, paragraph 0034-0035 and page 3, paragraph 0040).

However, Borecki does not explicitly teach automating the steps of accessing said credit card company server. Specifically, Borecki does not explicitly teach:

at a user location disposed on the network, resolving a machine-resolvable code (MRC) having coded information contained therein and disposed on the credit card of the user, the coded information having no personal information contained therein relating to the user or routing information over a network;

extracting coded information from the MRC, the coded information associated with routing information that is associated with both the personal account information of the user and a credit card company server;

in response to the steps of resolving and extracting, obtaining the routing information to the credit card server associated with the extracted coded information;

connecting the user location to the credit card company server across the network over a determined route in accordance with the routing information.

In the same field of endeavor, Perkowski teaches a system and method for automatically retrieving information related to a commercial product by scanning an MRC, the coded information having no personal information contained therein relating to the user or routing information over a network (Perkowski, col. 3, line 63 - col. 4, line 4; col. 5, lines 19-26 and col. 19, lines 38-40).

Perkowski teaches at a user location disposed on the network, reading a machine-resolvable code (MRC) disposed on a commercial product of a user with a reading device (Perkowski, col. 3, line 63 - col. 4, line 4; col. 5, lines 19-26 and col. 19, lines 38-40);

extracting coded information from the MRC, the coded information associated with routing information that corresponds to the commercial product information stored on a company server disposed on the network (Perkowski, col. 19, lines 12-55);

in response to the steps of reading and extracting, obtaining the routing information associated with the extracted coded information (Perkowski, col. 19, lines 12-55);

connecting the user location to the company server across the network over a determined route in accordance with the routing information (Perkowski, col. 19, lines 12-55).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have incorporated the automated data entry and data locating system, as taught by Perkowski, into the credit card account information retrieval

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system of Borecki, for the purpose of enhancing the user friendliness of the system by automating manual data entry and automatically retrieving credit card information.<sup>72</sup>

Appellants submit the Examiner has simply broken Appellants' invention into its component parts and then attempted to find a prior art reference corresponding to each component to support an obviousness rejection under 35 U.S.C. § 103. In order to establish a *prima facie* case of obviousness using the combination of the respective references, the Examiner must first show that each of the references is analogous prior art and then provide an explanation as to whether the overall disclosures of the references, the teachings therein and the suggestions associated therewith, in addition to the level of skill in the art, support a conclusion of obviousness as it relates to the entire invention. The combination of these references as applied to the Claims is conclusory, and that no articulated reasoning with some rational underpinning to support the combination has been provided. Further, Appellants submit that support for the combination is based on hindsight and that the combination is improper.

### **1. Independent Claim 1 as rejected by the combination of *Borecki-Perkowski*.**

In the Final Office Action mailed February 14, 2007, the Examiner maintains the 35 U.S.C. § 103 rejection of Claims 1-5 and 7-12. On page 2 of the Final Office Action the Examiner states:

As to claim 1, Borecki teaches the invention substantially as claimed. Borecki teaches a system and method of accessing personal account information of a credit card associated with a user over a global communication packet-switched network, comprising the steps of:

connecting a user location to the specific and unique credit card company server across the network in accordance with a known URL (Borecki, Figure 2A and page 2, paragraph 0034-0035);

transmitting the account information to the specific and unique credit card company server over the network (Borecki, Figure 2A and page 2, paragraph 0034-0035 and page 3, paragraph 0039);

using customer account information at the specific and unique credit card company server to determine the personal account information associated with the customer account information from the credit card company server, to the user location (Borecki, page 3, paragraph 0040); and

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<sup>72</sup> See Final Office Action dated October 5, 2006, at pages 2-4

presenting the information to the user at the user location (Borecki, page 2, paragraph 0034-0035 and page 3, paragraph 0040).<sup>73</sup>

The Examiner further states that “. . . Borecki does not explicitly teach automating the steps of accessing said credit card company server,” and then provides *Perkowski* to cure the deficiency and states “[it] would have been obvious to one having ordinary skill in the art at the time the invention was made to have incorporated the automated data entry and data locating system, as taught by *Perkowski*, into the credit card account information retrieval system of Borecki, for the purpose of enhancing the user friendliness of the system by automating manual data entry and automatically retrieving credit card information.”

## **2. The Cited References – Teaching/Suggestion/Motivation Test.**

The process for determining obviousness is to analyze under the teaching-suggestion-motivation test. As previously discussed, the recent *KSR* Supreme Court case indicated that the Teaching-Suggestion-Motivation (TSM) test is not a rigid test; however, it is still considered to be a factor. Under this test, each of the references must contain some type of teaching, as well as some type of suggestion, to allow for the combination. One also must be motivated to combine the references. If this test alone were utilized, the questions that must be answered are whether *Borecki* and *Perkowski* contain any teaching that would suggest to one skilled in the art to combine these two references to overcome the problem addressed by the present application, and whether any motivation to so combine exists. In the Response dated November 20, 2006, to the Office Action dated May 18, 2006, the arguments thereof repeated herein, Appellants question whether the cited references contain a teaching that would suggest the combination provided by the Examiner. The Examiner provided *Perkowski* to cure the deficiencies in *Borecki* regarding the automating the steps of accessing said credit card company server.

### **a. Discussion of U.S. Patent Publication No. 2002/0016749 to Borecki et al.**

The primary reference the Examiner has cited is the *Borecki* reference. The primary purpose of *Borecki* is to provide private and secure electronic purchasing via the Internet.<sup>74</sup> *Borecki* provides a central server (12) configured with merchant databases and various modules

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<sup>73</sup> See Final Office Action, mailed February 14, 2007, pages 2-3.

<sup>74</sup> See *Borecki*, Abstract.

to provide private and secure purchasing for registered users.<sup>75</sup> The modules include a pricing module (24), a digital checkbook module (28), a temporary card numbers module (30), an account cross-referencing module (32) and an omnibus accounting module 34.<sup>76</sup> The database includes a merchant database and, optionally in a database unit (36), a customer database, an IDs and password database, a customer balance database, a customer history database, a card number database, and a pricing database.<sup>77</sup>

A user computer (40) can connect to the central computer system (12) through the Internet (42).<sup>78</sup> The user initially signs up for the service through a sign-up process. The user selects a User ID and a password. Then, after filling out the application either online or off-line, the user selects a funding option of either debit from a personal checking account or a charge to a credit card account. The *Borecki* system provides the user an account number and member number. The user may then fund the account.<sup>79</sup>

Once registered, the user accesses the Internet and chooses to connect to the central computer system by entering the central computer system URL (i.e., <http://www.Interchecks.com>).<sup>80</sup> The user signs-on to the central computer system and activates their digital checkbook by entering a member number. The central computer system determines if the member number is valid. If the member number is valid, the central computer system prompts the user to enter their User ID and password. If the correct User ID and password are entered, the system grants the user access.<sup>81</sup> Thereafter, the user can request and obtain account information or request that the system display the user's digital checkbook with account information. When the user opens the checkbook, the system issues the user temporary debit card numbers and temporary credit card numbers.<sup>82</sup> The digital checkbook is a register of the member's account. When the user seeks to make internet purchases and opens the digital checkbook, the system finds a series of card numbers that are not in use and have never been assigned to that user and, using those numbers, assigns a temporary debit card number and a

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<sup>75</sup> See *Borecki*, page 2, paragraphs 0030 and 0031.

<sup>76</sup> See *Borecki*, page 2, paragraph 0030.

<sup>77</sup> See *Borecki*, page 2, paragraph 0030.

<sup>78</sup> See *Borecki*, Figure 1; page 2, paragraph 0031.

<sup>79</sup> See *Borecki*, page 2, paragraph 0036.

<sup>80</sup> See *Borecki*, Figure 2A; page 2, paragraph 0034.

<sup>81</sup> See *Borecki*, page 3, paragraph 0039.

<sup>82</sup> See *Borecki*, page 2, paragraph 0035.

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temporary credit account number to the user.<sup>83</sup> The temporary card numbers are linked to the user account and are active for a predetermined period of time. User account information, such as account balance and card numbers, is placed on the user computer in the form of an output identification file.<sup>84</sup>

The user may access various merchant sites to make purchases using the *Borecki* system. If the merchant is partnered with the private and secure purchasing system (i.e., the *Borecki* system), the user may select an icon on the merchant site to provide payment for products selected for purchase on the merchant site. In such case, the transactions are treated as debit card transactions. However, if the merchant is not partnered with the private and secure purchasing system, the user provides the temporary credit card numbers to provide payment for the products selected for purchase on the merchant site. In this case, information is routed through a bank card processor. The bank card processor transmits an approval or denial of the purchase. If the transaction is approved by the bank card processor, funds are transferred to the merchant processor. As such, this transaction is treated as a credit card transaction.<sup>85</sup>

Independent claim 1 recites a method of accessing personal account information of a credit card associated with a user over a global communication packet-switched network, comprising the steps of: at a user location disposed on the network, resolving a machine-resolvable code (MRC) having coded information contained therein and disposed on the credit card of the user, the coded information having no personal information contained therein relating to the user or routing information over a network; extracting the coded information from the MRC, the coded information associated with routing information that is associated with both the personal account information of the user and a specific and unique credit card company server having stored thereat the personal account information of the user; in response to the steps of resolving and extracting, obtaining the routing information to the credit card server associated with the extracted coded information; connecting the user location to the specific and unique credit card company server across the network over a determined route in accordance with the obtained routing information.

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<sup>83</sup> See *Borecki*, page 3, paragraph 0041.

<sup>84</sup> See *Borecki*, page 3, paragraph 0042.

<sup>85</sup> See *Borecki*, page 2, paragraph 0032.

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Appellants submit that *Borecki* does not disclose, or contemplate, resolving an MRC to extract coded information associated with routing information that is associated with both the personal account information of the user and a specific and unique credit card company server. The Examiner concedes that the primary citation to *Borecki* does not disclose, at a user location disposed on the network, resolving a machine-resolvable code (MRC) having coded information contained therein and disposed on the credit card of the user. The Examiner states:

However, *Borecki* does not explicitly teach automating the steps of accessing said credit card company server. Specifically, *Borecki* does not explicitly teach:

at a user location disposed on the network, resolving a machine-resolvable code (MRC) having coded information contained therein and disposed on the credit card of the user, the coded information having no personal information contained therein relating to the user or routing information over a network;

extracting coded information from the MRC, the coded information associated with routing information that is associated with both the personal account information of the user and a credit card company server;

in response to the steps of resolving and extracting, obtaining the routing information to the credit card server associated with the extracted coded information;

connecting the user location to the credit card company server across the network over a determined route in accordance with the routing information.<sup>86</sup>

Nonetheless, the Examiner rejects Independent Claim 1 stating that “*Borecki* teaches the invention substantially as claimed” and contending that the secondary citation to *Perkowski* provides this necessary disclosure. This contention is respectfully traversed as discussed with respect the combination of *Borecki* and *Perkowski* herein below.

Further, Independent Claim 1 recites connecting the user location to the specific and unique credit card company server across the network over a determined route in accordance with the obtained routing information. The Examiner states *Borecki* discloses “connecting a user location to the specific and unique credit card company server across the network in accordance

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<sup>86</sup> See Final Office Action mailed February 14, 2007, page 3.

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with a known URL (Borecki, Figure 2A and page 2, paragraph 0034-0035).<sup>87</sup> The relevant portion of *Borecki* states:

FIG. 2A is a flowchart 70 which diagrams procedures executed by and implemented in central computer system 12 of system 10 (shown in FIG. 1). After a user initiates 72 Internet access, *they choose to connect 74 to the private and secure purchases provider web site*. The user may choose to exit 76 at this time. Alternatively, if the user chooses to continue, they are queried 78 if they are accessing central computer system 12 for the first time. *If the user is accessing for the first time, a sign up process is initiated 80* which is described in further detail in FIG. 2B below. If not accessing for the first time, the user establishes 82 a secure connection to the private and secure purchases provider web site, and enters 84 their digital checkbook, which is described in further detail in FIG. 2C below.

The user then chooses whether to request and obtain 86 account information or to display 88 their checkbook with account information. After account information is requested and obtained 86, the checkbook with account information is displayed 88. After display 88 of checkbook with account information, the user opens the checkbook and is issued 90 secure temporary card numbers, both debit and credit, for Internet purchases, which are described in further detail in FIG. 2E below. After temporary card numbers are issued 90, the user chooses 92 whether or not to make purchases via the Internet. The user exits 94 if no purchasing is to be done at this time. Internet purchasing is further described in FIG. 2F below.<sup>88</sup> (*emphasis added*)

Appellants previously stated “the user initiates an Internet access and then may choose to connect to a private and secure purchase provider web site.”<sup>89</sup> In Figure 2A, *Borecki* illustrates that the customer initiates a communication link via direct access to the Internet to connect to a URL, i.e., <http://InterChecks.com>. *Borecki* expressly teaches that the user establishes a connection to the private and secure purchases provider web site prior to inputting any user account information.

Next, Independent Claim 1 recites “transmitting the extracted coded information to the specific and unique credit card company server over the determined route during the step of

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<sup>87</sup> See Final Office Action mailed February 14, 2007, page 2.

<sup>88</sup> See *Borecki*, page 2, paragraphs 0034-0035.

<sup>89</sup> See Response dated February 13, 2006, page 7.

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connecting.” The Examiner again cites *Borecki*, Figure 2A and page 2, paragraphs 0034-0035 with page 3, paragraph 0039, for this teaching. The additional paragraph in *Borecki* states:

FIG. 2C is a flowchart 140 which further illustrates of a process where a *user signs on and activates* their digital checkbook. A user signs on by *entering 142 their private and secure purchasing provider member number*. If the entered membership number is valid 144, the user is instructed to enter 146 their user ID and password. If the user ID is valid 148, access is granted 150. User IDs and membership numbers are provided in a database 152, which is part of database 36 (shown in FIG. 1). If an invalid member number is entered, and the number of attempts to enter the digital checkbook is below 154 a threshold, the user may retry 156 entering the digital checkbook, otherwise central computer system 12 (shown in FIG. 1), disconnects the user, forcing an exit 158. If a membership number entered 142 is valid 144, but the user ID entered 146 is not valid 148, an E-mail notification is sent 160 to the account holder of record, and central computer system 12 exits 162.<sup>90</sup> (*emphasis added*)

*Borecki* teaches that a user enters their member number, and if valid, the system prompts the user for their User ID and password. Therefore, *Borecki* requires a member number, a User ID, and a password to be entered at a user location in order to gain access to the private and secure purchase provider. As Appellants previously stated “[therefore,] the information that is provided by the user is merely that for accessing the private and secure purchases provider web site.”<sup>91</sup> As such, *Borecki* expressly teaches 3 pieces of information (the member number, User ID and password) are *entered after* the user accesses the private and secure purchase provider site whose location was accessed by a known URL. However, *Borecki* does not disclose that this information is transmitted during the step of connecting.

Further, the Examiner mischaracterizes this element of the claim by changing the term “transmitting the extracted coded information” to “transmitting the account information.” Appellants do not dispute that the information the user enters to sign-on to the private and secure purchase provider in *Borecki* is a member number, User ID and password, which can be interpreted as account information. However, Independent Claim 1 of the instant application recites that the extracted coded information that is transmitted is associated with routing information associated with *both* the personal account information and the specific and unique

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<sup>90</sup> See *Borecki*, page 3, paragraph 0039.

<sup>91</sup> See Response dated February 13, 2006, page 8.

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credit card company server. *Borecki* does not teach coded information, or any information, that is associated with routing information associated with both the personal account information and the specific server. Clearly, *Borecki* teaches away from the concept of a single code associated with routing information associated with both personal account information and the specific and unique server, as *Borecki* teaches there must be at least a URL, a member number, a User ID and a password separately. As such, *Borecki* also fails to teach the transmission of such coded information. Thus, *Borecki* cannot reasonably be interpreted to disclose the aforementioned feature of Independent Claim 1.

After transmitting the extracted coded information to the specific and unique credit card company server, Independent Claim 1 recites “using the transmitted coded information at the specific and unique credit card company server to determine the personal account information associated with the extracted coded information.” The Examiner cites *Borecki*, page 3, paragraph 0040 for this teaching stating:

using customer account information at the specific and unique credit card company server to determine the personal account information associated with the customer account information from the credit card company server, to the user location (*Borecki*, page 3, paragraph 0040).<sup>92</sup>

As Appellants previously stated “there is some association someplace between the user password and the personal account encoded information, as this is what allows the user to enter their digital checkbook … [thereafter] as set forth in blocks 84 and 86 of Fig. 2a, the program will flow to a block wherein the customer account information *can be requested and obtained*.<sup>93</sup> *Borecki* expressly teaches a method and means whereby a central server, after a user entering sign-on information, provides the user *access* to their account. The server determines personal account information only after the user enters, separately, a specific URL to connect to the server, a member number to be validated by the server, a User ID and a password. *Borecki* does not teach or contemplate using, at the specific and unique server, the same coded information that provided routing information to the specific and unique server in order to access personal account information. Thus, *Borecki* cannot reasonably be interpreted to disclose the aforementioned feature of Independent Claim 1.

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<sup>92</sup> See Final Office Action, mailed February 14, 2007, pages 2-3.

<sup>93</sup> See Response dated February 13, 2006, page 8.

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The Examiner provides *Borecki*, paragraphs 0034, 0035 and 0040, to teach “returning the determined personal account information from the specific and unique credit card company server to the user location; and presenting the determined personal account information to the user at the user location” as recited by Independent Claim 1.<sup>94</sup>

Thus, to apply *Borecki* for the purpose of obviating Claim 1 in the present application, the Examiner must show that *Borecki* contains a teaching, suggestion, or motivation to solve the problem solved by Appellants’ present claims. *Borecki* must also suggest that, at the time of the invention, a problem existed that could be solved by incorporating a Machine Resolvable Code (MRC) on a credit card of a user in order to extract coded information from the MRC such that the coded information is associated with routing information associated with both personal account information and the specific and unique credit card location. *Borecki* does not contain any such teaching, suggestion or motivation.

### **b. Discussion of U.S. Patent No. 6,064,979 to *Perkowski*.**

The Examiner has provided *Perkowski* to cure the deficiencies in *Borecki*. Specifically, the Examiner has relied on *Perkowski*, “[to teach] a system and method for automatically retrieving information related to a commercial product by scanning an MRC, the coded information having no personal information contained therein relating to the user or routing information over a network.”<sup>95</sup> The Examiner further states:

In the same field of endeavor, *Perkowski* teaches a system and method for automatically retrieving information related to a commercial product by scanning an MRC, the coded information having no personal information contained therein relating to the user or routing information over a network (*Perkowski*, col. 3, line 63 - col. 4, line 4; col. 5, lines 19-26 and col. 19, lines 38-40).

*Perkowski* teaches at a user location disposed on the network, reading a machine resolvable code (MRC) disposed on a commercial product of a user with a reading device (*Perkowski*, col. 3, line 63 - col. 4, line 4; col. 5, lines 19-26 and col. 19, lines 38-40);

extracting coded information from the MRC, the coded information associated with routing information that corresponds to the commercial product information stored on a company server disposed on the network (*Perkowski*, col. 19, lines 12-55);

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<sup>94</sup> See Final Office Action, mailed February 14, 2007, pages 2-3.

<sup>95</sup> See Final Office Action mailed February 14, 2007, page 3.

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in response to the steps of reading and extracting, obtaining the routing information associated with the extracted coded information (Perkowski, col. 19, lines 12-55);

connecting the user location to the company server across the network over a determined route in accordance with the routing information (Perkowski, col. 19, lines 12-55).<sup>96</sup>

*Perkowski* provides a method and system for finding and serving consumer product-related information on the Internet.<sup>97</sup> *Perkowski* is directed towards the concept of providing an interface to a user to allow that user to search information regarding either a product having an associated Universal Product Code (UPC) or Universal Product Number (UPN) or information regarding products associated with the trademark (noting this association is not disclosed as being on a product or brochure).<sup>98</sup> *Perkowski* provides two methods of operation.<sup>99</sup> Each of these systems utilizes a browser programmed as the GUI-based interface for the user. The two independent modes of operation are the “Internet Product Service Information (IPSI) Find Mode” and the “UPSN Search Mode” system.<sup>100</sup> The user may be provided with an icon on their local internet browser.<sup>101</sup> Alternatively, the user selects an icon within an internet browser on their computer.<sup>102</sup> Upon selection of the icon, the user is connected through the internet to the IPSI Web-site.<sup>103</sup> The web-site may be accessed by a known URL, such as <http://www.ipsi.com>.<sup>104</sup> Regardless of whether the user is required to access the IPSI web-site first or is provided an icon on their browser, the user must select the IPSI finder button to initiate the functionality of the *Perkowski* system.<sup>105</sup> Selecting the IPSI finder button transmits entered UPC information to the IPSI server located on the internet.<sup>106</sup> When selecting the IPSI finder button, the user enters the product UPC information.<sup>107</sup> The UPC is encoded with a 12 digit number representing a manufacturer (first 6 digits), product (next 5 digits), and a check digit.

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<sup>96</sup> See Final Office Action mailed February 14, 2007, page 4

<sup>97</sup> See *Perkowski*, Abstract.

<sup>98</sup> See *Perkowski*, Col 3, lines 55-67; and Col. 4, lines 1-14.

<sup>99</sup> See *Perkowski*, Col 3, lines 55-67; and Col. 4, lines 1-14.

<sup>100</sup> See *Perkowski*, starting at Col 18, line 55 in the section entitled “Operation of the IPSI Finding System and Method.”

<sup>101</sup> See *Perkowski*, Col 8, lines 25-36.

<sup>102</sup> See *Perkowski*, Col 8, lines 37-45.

<sup>103</sup> See *Perkowski*, Col 8, lines 45-55.

<sup>104</sup> See *Perkowski*, Col 8, lines 55-60.

<sup>105</sup> See *Perkowski*, Col 8, lines 64-67; Col. 15, lines 53-60.

<sup>106</sup> See *Perkowski*, Col 8, lines 39-55; Col. 15, lines 55-59.

<sup>107</sup> See *Perkowski*, Col 15, lines 55-59.

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The 12 digit, human readable number, is printed on the bottom of the UPC.<sup>108</sup> A user may manually enter a registered product's UPN (e.g., the UPC 12 digit numerical string) into a dialogue box of an Internet browser or Internet application tool.<sup>109</sup> The user may also scan the UPSN (Universal Product / Service Number – i.e., UPC) with a bar code symbol scanner.<sup>110</sup> Regardless of the method of entry of the UPC, the system (i.e, the IPSI server) performs a query based upon the UPC to determine if a corresponding URL for the product/manufacturer exists in an IPSI Registrant Database.<sup>111</sup> If so, the URL, or list of URL's is provided to the user.<sup>112</sup> Thereafter, the user selects a URL corresponding to a web-site the user desires to access.<sup>113</sup>

The Examiner provides *Perkowsky* to teach “at a user location disposed on the network, resolving a machine-resolvable code (MRC) having coded information contained therein and disposed on the credit card of the user, the coded information having no personal information contained therein relating to the user or routing information over a network; and extracting the coded information from the MRC, the coded information associated with routing information that is associated with both the personal account information of the user and a specific and unique credit card company server having stored thereat the personal account information of the user” as recited by Independent Claim1. Appellants agree that *Perkowsky* teaches the concept of extracting coded information from the MRC wherein this coded information is associated with routing information that corresponds to the commercial product information stored on a company's server.<sup>114</sup> However, *Perkowsky* contains no disclosure that the extracted information corresponds to routing information associated with both personal account information and the specific and unique server. *Perkowsky* teaches that the information extracted from the UPC is a 12 digit number. This 12 digit number is associated with a specific URL or series of URL's only. As such, *Perkowsky* merely provides a translation table that provides a relationship between an arbitrary code and a location on the network. The aforementioned feature of Independent Claim 1 recites that the extracted coded information corresponds to routing information that is associated to a particular piece of information (personal account information)

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<sup>108</sup> See *Perkowsky*, Col 12, lines 3-19.

<sup>109</sup> See *Perkowsky*, Col 19, lines 23-28.

<sup>110</sup> See *Perkowsky*, Col 19, lines 38-40.

<sup>111</sup> See *Perkowsky*, Col 15, lines 60-67.

<sup>112</sup> See *Perkowsky*, Col 15, lines 60-67; and Col. 19, lines 41-44.

<sup>113</sup> See *Perkowsky*, Col 19, lines 45-55.

<sup>114</sup> See Response dated February 13, 2006, page 9.

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*and* a particular server on the network (the specific and unique credit card server). Thus, *Perkowsky* does not provide a disclosure that remedies the aforementioned, conceded deficiency in the primary citation to *Borecki*.

Further, Independent Claim 1 of the instant application recites “in response to the steps of resolving and extracting, obtaining the routing information to the credit card server associated with the extracted coded information.” The Examiner contends that *Perkowsky* teaches this feature of Independent Claim 1 of the instant application. The relevant portion of *Perkowsky* states:

When the system is in this operational mode, as illustrated in FIGS. 3A, 4A and 5A, 6A, a Web-based information resource pertaining to any commercial product or service registered with the system can be displayed and selected by the user in order to automatically access the same from the Internet. Such information resources can include advertisements, specifications, operation descriptions, product simulations, purchase information, maintenance information, warranty and servicing information, product updates, distributor information, incentives (e.g. discounts, rebates, coupons, etc.), electronic data transaction screens, etc. In this mode, desired product or service information is obtained by simply manually entering the registered product's UPN (e.g. its UPC's 12 digit numerical string) or the registered service's USN (e.g. its UPC's 12 digit numerical string) into the dialogue box of the Internet browser or Internet application tool. When using the seeded IPSI Database described hereinabove, only the first six digits of the UPC number need be entered into the dialogue box. An exemplary display screen produced from the IPSD Server might be as follows:

"Simply enter the 12 digit UPC the particular product; click REQUEST, and then wait for the display of the list of Web locators (URLs) at which the desired product information can be found on the Internet."

Alternatively, a bar code symbol scanner can be used to enter the UPSN (e.g. UPC or USC number) into the system, thereby avoiding manual keyboard entry operations.

In response to such data entry operations, a list of URLs organized according to the information subfield classifications set forth in FIG. 2A2 are displayed on Client System C<sub>a</sub> making the request of the IPSD Server. At this stage, another display screen would appear with an exemplary message as follows:

"Please select the URL from the displayed URL list using the information subfield product information category displayed above. This will connect you to the product

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information related to the selected URL. You can return to the URL display list at anytime."

Upon selecting a particular URL from the displayed URL list, video and audio information content are automatically displayed on the Client System from the IPSI Server hosting the selected URL.<sup>115</sup> (*emphasis added*)

However, Perkowsky expressly teaches the operation of the IPSI server in response to the entering of UPC information is as follows:

In order to enter the IPSI Finder mode of the system, *the user selects the "IPSI Finder" button* on the GUI-based browser display screen. Then at Block A of FIG. 6A, a UPSN is provided as input to IPSD Server S<sub>b</sub>, and in response thereto the Client System C<sub>a</sub> requests the IPSD Server S<sub>b</sub> to provide each registered URL<sub>i</sub> stored in the IPSI Registrant Database.

At Block B in FIG. 6A, the IPSD Server S<sub>b</sub> *analyses the IPSI Registrant Database shown in FIG. 2A1 to determine whether or not a symbolically linked URL<sub>i</sub> has been registered with UPSN<sub>i</sub> that has been provided as input*. If so, then in response to a URL selection query based on the contents of the information subfields shown in FIG. 2A2 and displayed on the screen of the Client System C<sub>a</sub>, the IPSD Server S<sub>b</sub> sends to the IPSI Server S<sub>c</sub> hosting the user-selected URL<sub>i</sub>, a request for the IPSI Server S<sub>c</sub> to send product or service information at the selected URL<sub>i</sub> to the requesting Client System C<sub>a</sub>. If the IPSD Server S<sub>b</sub> determines that there does not exist a URL<sub>i</sub> in the IPSI Registrant Database symbolically linked with the UPSN<sub>i</sub> provided as input to the Client System C<sub>a</sub>, then the IPSD Server S<sub>b</sub> records the URL-request in the Non-IPSI Registrant Database for future registration operations with the company related to the input UPSN<sub>i</sub>.

At Block C in FIG. 6A, the IPSI Server S<sub>c</sub> receives the user-selected URL<sub>i</sub> sent from the IPSD Server S<sub>b</sub> and then provides to the Client System C<sub>a</sub>, the product or service information located by the registered URL<sub>i</sub>. Having accessed and displayed such product or service related information at the Client System, the user can review the information at the selected URL<sub>i</sub>, acquire knowledge about the product or service, and may, if the option is provided at the URL-specified Web-site, purchase the product or service by way of an on-screen electronic commercial transaction.<sup>116</sup> (*emphasis added*)

Clearly, *Perkowsky* teaches that the user must not only enter the UPC, manually or by scan operation, but must also select the IPSI Finder button. *Perkowsky* explicitly teaches that

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<sup>115</sup> See *Perkowsky*, Col. 19, lines 12-55.

<sup>116</sup> See *Perkowsky*, Col. 15, lines 53-67; and Col. 16, lines 1-18.

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scanning the UPC merely enters the 12 digit number into the browser. Further, as a result of the user selecting the IPSI Finder button and entering the UPC, the user makes a request of the Internet Product and Service Directory (IPSD) server to query the IPSI Registrant Database to determine if a URL has been registered with the UPC that has been entered. If the PSD server finds a registered URL containing the UPC, the URL, or a list of URLs if more than one URL is registered with the UPC, is returned to the user. As Appellants previously stated “*Perkowsk*i merely provides a translation database that provides the relationship between an arbitrary code and a location on the network.”<sup>117</sup> As such, routing information is returned, not in response to resolving and extracting, but in response to the user initiating a request for the URL. Thus, *Perkowsk*i does not provide a disclosure that remedies the aforementioned, conceded deficiency in the primary citation to *Borecki*.

Additionally, Independent Claim 1 of the instant application recites “connecting the user location to the specific and unique credit card company server across the network over a determined route in accordance with the obtained routing information.” The Examiner, though stating that *Borecki* both does not teach this feature and teaches this feature at page 2, paragraphs 0034-0035,<sup>118</sup> again cites *Perkowsk*i, column 19, lines 12-55 to provide this teaching. However, *Perkowsk*i explicitly teaches that the user is provided a list of URLs. Thereafter, the user selects a URL for connection to a location containing product information. The relevant portion of *Perkowsk*i, contained within the portion cited by the Examiner, states:

In response to such data entry operations, a list of URLs organized according to the information subfield classifications set forth in FIG. 2A2 are displayed on Client System C<sub>a</sub> making the request of the PSD Server. At this stage, another display screen would appear with an exemplary message as follows:

"Please select the URL from the displayed URL list using the information subfield product information category displayed above. This will connect you to the product information related to the selected URL. You can return to the URL display list at anytime."

*Upon selecting a particular URL from the displayed URL list, video and audio information content are automatically displayed on the Client System from the IPSI Server hosting the selected URL.*<sup>119</sup> (*emphasis added*)

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<sup>117</sup> See Response dated February 13, 2006, page 9.

<sup>118</sup> See Final Office mailed February 14, 2007, page 2 and 3.

<sup>119</sup> See *Perkowsk*i, Col. 19, lines 41-55.

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Therefore, Perkowski teaches that the user establishes a connection to the location containing product information. Perkowski teaches, and is limited to teaching, entering a UPC number, either manually or by scanning operation, to obtain a URL that the user may select in order to access a website containing information about a product related to the UPC. As such, *Perkowski* does not provide a disclosure that remedies the aforementioned, conceded deficiency in the primary citation to *Borecki*.

### **3. Conclusion – TSM Test.**

Although the recent *KSR* Supreme Court case has indicated that the teaching-suggestion-motivation (TSM) test is not a rigid test, it is still considered to be a factor. Under this test, there must be some type of teaching in each of the references for combination as well as some kind of suggestion. There also must be some motivation to combine the three references. If this test alone is utilized, the question would be whether there is any teaching in *Borecki* and *Perkowski* that would suggest to one skilled in the art to combine the references or is there any motivation to so combine.

Further, Appellants submit that neither *Borecki* nor *Perkowski* discloses all the limitations of Independent Claim 1. In particular, it is submitted that the primary citation to *Borecki* does not disclose the claimed coded information extracted from an MRC, the extracted coded information associated with routing information that is associated with both the personal account information of the user and a specific and unique credit card company server having stored thereat the personal account information of the user. Accordingly, without conceding the propriety of the asserted combination, the asserted combination of *Borecki* and *Perkowski* is likewise deficient, even in view of the knowledge of one of ordinary skill in the art.

*Borecki* provides a private and secure account to enable a user to make private and secure purchases via the Internet. A registered user accesses the internet and chooses to connect to a central server by entering a known URL. After accessing the central server located on the internet, the registered user enters a member number, User ID and password to sign-on to the system. The user is then provided with account information in the form of a digital checkbook and temporary debit and credit card numbers for use in electronic purchases. However, there is no disclosed use of a machine resolvable code disposed on the credit card of a user wherein the

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MRC is associated with personal account information of the credit card associated with the user (as set forth in the preamble of the claim). Additionally, *Borecki* contains no disclosure that extracted information is *transmitted* to the central server to determine the personal account information. As such, *Borecki* only discloses an account system, whereby, after the user enters a known URL to connect to the system via the internet; then, the user enters a member number, User ID and Password to obtain access to the user's account information. *Borecki* contains no suggestion, teaching or motivation for using an MRC located on a credit card of a user to *both* access a credit card server located on the internet *and* second locate personal account information of the user could be useful for its intended purpose. Further, *Borecki* teaches away from using a single code for accessing the secure and private server wherein *Borecki* explicitly requires the separate entry of three separate pieces of information: the member number, User ID, and password.

*Perkowski* provides for scanning the UPC of a product and accessing advertising information associated with a registered product. When placed in a “finder mode,” the system allows a predetermined information resource to be accessed by simply entering the registered product’s UPN. *Perkowski* teaches that a scanner may be used to enter the 12-digit, human readable number encoded in the registered product’s UPN into the user’s browser on the user’s personal computer. However, the information extracted from the UPN is only the 12-digit human readable number. *Perkowski* contains no disclosure that this encoded information is associated with routing information associated with both the personal account information of the user *and* the specific and unique server having the personal account information stored thereat. Additionally, *Perkowski* contains no disclosure that the routing information is obtained *in response* to the step of extracting coded information from the MRC. As such, *Perkowski* merely provides a translation database that returns URLs registered with the 12-digit UPC number of the product. *Perkowski* contains no teaching, suggestion or motivation for a single MRC that is associated with a credit card and a user be utilized to perform the steps set forth in *Borecki*, i.e., that of connecting the user to the secure server and then determining the personal account information based upon the MRC.

Based on the TSM test, the Examiner’s position is conclusory. Clearly, *Perkowski* is merely utilized for scanning the UPC in order to obtain information about a product utilizing that

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product code (i.e., UPC). The product code is specifically associated with that product and the product code is utilized to obtain information in *Perkowski* after accessing a particular web site. The code contains nothing that would return the location of a particular web site that would have an association with personal account information in addition to transmission of that code to the access location for the purpose of then using that code to obtain the personal account information. In order to have such an MRC, *Perkowski* would require that there be a relational database at a first location for determining the location of the credit card server and then a relational database stored at the credit card server for determining the personal account information. However, *Perkowski* contains no such teaching or suggestion and it is this lack of teaching, suggestion or motivation to utilizing an MRC to replace two steps, the first step being the accessing of the credit card server and the second being the accessing of personal account information. These are two different steps that must inherently be conducted at two different locations. As such, *Borecki* and *Perkowski*, taken singularly or in combination, do not anticipate or render obvious Appellants' present inventive concept, as set forth in Claims 1-5 and 7-12.

Therefore, no reason, motivation or suggestion exists to combine *Borecki* with *Perkowski*. *Borecki* has no need to use the UPC of *Perkowski*, as the *Borecki* system provides a member number, User ID, and password to enable a user to sign-on to the system and obtain access to the user's personal account information. Since the coded information in the UPC in *Perkowski* only enters the 12-digit number into a browser to be used, after a user connects to the system, by a server to return links that registered to the 12-digit number, the question is "Why would one skilled in the art want to use a 12-digit number, encoded into a UPC to transmit to a central server where at least a member number or User ID and password would still be required in order to maintain the security of the *Borecki* system? The Examiner states that one skilled in the art would combine *Borecki* with *Perkowski* for the purpose of enhancing the user friendliness of the system by automating manual data entry and automatically retrieving credit card information. However, there is no motivation or suggestion that would in any way lead one skilled in the art to combine such. Combining *Borecki* with *Perkowski* still would require the user to enter a URL address, either by typing or selecting a pre-programmed button; then enter, either manually or by a scanning operation, a number to obtain a separate URL; then selecting a URL from a list of URLs provided; then, still, enter a User ID and password in order to obtain access to account information. As such, the user still would be required to perform extensive

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manual entry and the system user friendliness would not be enhanced but, rather, increased. Thus, *Perkowski* does not provide a disclosure that remedies the aforementioned, conceded deficiency in the primary citation to *Borecki*.

#### **4. KSR Test:**

The recent *KSR* case, although not fully analyzed as to its impact on obviousness type rejections under 35 U.S.C. § 103, indicates that the test is “if a person of ordinary skill can not implement a *predictable variation*, §103 likely bars it’s patentability.”<sup>120</sup> The question would be whether *Borecki* could be varied in a predictable manner under this dicta to obtain routing information associated to both personal account information and a specific and unique credit card server, in response to extracting information from an MRC on a credit card, wherein the personal account information is stored at the specific and unique credit card server. *Borecki* would receive no benefit in using UPC information regarding a product to access a website containing product information. In Claim 1, the MRC performs two steps in response to the step of extracting the coded information: first, to obtain routing information to the specific and unique server; second, connect to the specific and unique credit card server in accordance with the obtained routing information, and in response to transmitting the extracted information, determining the personal account information of the user stored at the specific and unique credit card server. If the UPC information were used in the *Borecki* system, there is no indication that the extracted information could provide routing information associated to both the personal account information and the specific and unique credit card server, or that connects the user to the specific and unique credit card server in accordance with the associated routing information, if it existed. As such, there is no predictable variation of *Borecki* that would lead one skilled in the art to utilize the *Perkowski* UPC. When work is available in one field of endeavor, i.e., providing access to secure personal account information on a credit card server located on the Internet, there is no design incentive or other market force that would prompt a predictable variation of the *Borecki* reference to utilize UPC content for a purpose that is not useful or envisioned in *Borecki*. Further, the Examiner has not entered such a rejection and, as such, Appellants have not been provided the opportunity to fully develop an evidentiary record to counter such argument. Until such argument has been put forth by the Examiner, Appellants will

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<sup>120</sup> *KSR*, 127 S. Ct. at page 1740.

not be able to counter such with appropriate evidence, as entering such is not in this stage of the prosecution is difficult if not impossible. Therefore, such a discussion of such by either the examiner or the Board is not believed to be proper. In summary, Appellants submit that the Examiner has failed to provide a *prima facie* case as to why the *Borecki* and *Perkowski* references, in combination, render obvious Appellants' present inventive concept, as defined by Claims 1-5 and 7-12.

**D. Dependent Claim 2-5 and 8 as rejected by the combination of Borecki et al. and Perkowski.**

Regarding Claims 2-5 and 8, the Examiner states in the Final Office Action dated October 5, 2006:

As to claims 2-5, and 8, *Borecki-Perkowski* teach (*sic*) the system wherein the MRC is an optical indicia, a barcode, wherein the optical indicia is used to extract the corresponding routing information and personal identification information, wherein a unique code is transmitted to a remote intermediate location, and returning a matched remote location information to the user (*Borecki*, Figure 2A and page 2, paragraph 0034-0035 and *Perkowski*, col. 3, line 63 - col. 4, line 4; col. 5, lines 19-26; and col. 19, lines 12-55).<sup>121</sup>

The Examiner contends that the combination of *Borecki* and *Perkowski* renders obvious dependent Claims 2-5 and 8. Claims 2-5 and 8 depend from, and further limit, Independent Claim 1. These dependent claims are allowable for at least the same reasons as the claim from which they depend, as discussed above. Additionally, Appellants submit that the combination of *Borecki* and *Perkowski* does not anticipate or render obvious Claims 2-5 and 8, even in view of the knowledge of one of ordinary skill in the art.

Dependent Claim 2 recites a method of Claim 1 wherein the MRC is optical indicia. Dependent Claim 3 recites a method of Claim 2 wherein the optical indicia is a bar code. *Perkowski* does teach the use of a UPC with a human-readable 12-digit number below the barcode.

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<sup>121</sup> See Final Office Action dated October 5, 2006, at pages 4 and 5.

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Dependent Claim 4 recites a method of Claim 1 wherein the routing information, in the step of obtaining, is stored on a user computer at the user location such that the coded information, in the step of extracting, is used to obtain the corresponding routing information from the user computer. The Examiner again cites *Borecki* at page 2, paragraphs 0034-0035 and *Perkkowski*, col 3, line 63 – col. 4, line 4; col. 5, lines 19-26; and col. 19, lines 12-55. The relevant sections from *Borecki* and *Perkowski* are:

In *Borecki*:

FIG. 2A is a flowchart 70 which diagrams procedures executed by and implemented in central computer system 12 of system 10 (shown in FIG. 1). After a user initiates 72 Internet access, they choose to connect 74 to the private and secure purchases provider web site. The user may choose to exit 76 at this time. Alternatively, if the user chooses to continue, they are queried 78 if they are accessing central computer system 12 for the first time. If the user is accessing for the first time, a sign up process is initiated 80 which is described in further detail in FIG. 2B below. If not accessing for the first time, the user establishes 82 a secure connection to the private and secure purchases provider web site, and enters 84 their digital checkbook, which is described in further detail in FIG. 2C below.

The user then chooses whether to request and obtain 86 account information or to display 88 their checkbook with account information. After account information is requested and obtained 86, the checkbook with account information is displayed 88. After display 88 of checkbook with account information, the user opens the checkbook and is issued 90 secure temporary card numbers, both debit and credit, for Internet purchases, which are described in further detail in FIG. 2E below. After temporary card numbers are issued 90, the user chooses 92 whether or not to make purchases via the Internet. The user exits 94 if no purchasing is to be done at this time. Internet purchasing is further described in FIG. 2F below.<sup>122</sup> (*emphasis added*)

In *Perkowski*:

Another object of the present invention is to provide such a system, wherein when the system is in its IPSI Finder Mode, a predesignated information resource (e.g. advertisement, product information, etc.) pertaining to any commercial product or service registered with the system can be automatically accessed from the

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<sup>122</sup> See *Borecki*, page 2, paragraphs 0034-0035.

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Internet and displayed from the Internet browser by simply entering the registered product's UPN or the registered service's USN into the Internet browser.<sup>123</sup>

Another object of the present invention is to provide such a system and method in the form of an electronic kiosk installed within a store and having an automatic projection-type, laser scanning bar code symbol reader for reading the UPC numbers on products being offered for sale in the store, and also a video display screen for displaying product-related information accessed from hyper-linked Web-sites on the Internet.<sup>124</sup>

When the system is in this operational mode, as illustrated in FIGS. 3A, 4A and 5A, 6A, a Web-based information resource pertaining to any commercial product or service registered with the system can be displayed and selected by the user in order to automatically access the same from the Internet. Such information resources can include advertisements, specifications, operation descriptions, product simulations, purchase information, maintenance information, warranty and servicing information, product updates, distributor information, incentives (e.g. discounts, rebates, coupons, etc.), electronic data transaction screens, etc. In this mode, desired product or service information is obtained by simply manually entering the registered product's UPN (e.g. its UPC's 12 digit numerical string) or the registered service's USN (e.g. its UPC's 12 digit numerical string) into the dialogue box of the Internet browser or Internet application tool. When using the seeded IPSI Database described hereinabove, only the first six digits of the UPC number need be entered into the dialogue box. An exemplary display screen produced from the IPSD Server might be as follows:

"Simply enter the 12 digit UPC the particular product; click REQUEST, and then wait for the display of the list of Web locators (URLs) at which the desired product information can be found on the Internet."

Alternatively, a bar code symbol scanner can be used to enter the UPSN (e.g. UPC or USC number) into the system, thereby avoiding manual keyboard entry operations.

In response to such data entry operations, *a list of URLs organized according to the information subfield classifications set forth in FIG. 2A2 are displayed on Client System C<sub>a</sub> making the request of the IPSD Server*. At this stage, another display screen would appear with an exemplary message as follows:

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<sup>123</sup> See Perkowski, col. 3, lines 63-67; and Col. 4, lines 1-4.

<sup>124</sup> See Perkowski, col. 5, lines 19-26.

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"Please select the URL from the displayed URL list using the information subfield product information category displayed above. This will connect you to the product information related to the selected URL. You can return to the URL display list at anytime."

Upon selecting a particular URL from the displayed URL list, video and audio information content are automatically displayed on the Client System from the IPSI Server hosting the selected URL.<sup>125</sup> (*emphasis added*)

*Borecki* teaches that a user must access a website by entering the website URL, for example <http://InterChecks.com>, as referenced by *Borecki* Figure 2A. Clearly, *Borecki* does not disclose storing any routing information *on* the user computer at the user location. *Perkowski* discloses that URLs registered with the corresponding UPC are displayed on a display of the user computer. However, *Perkowski* does not teach or suggest that the URL's are stored at the user computer such that, when the UPC is scanned the 12-digit number is extracted therefrom, the URL registered with the scanned UPC is retrieved from a translation database (e.g., the IPSI Registrant Database<sup>126</sup>) and stored on the user computer. *Borecki* and *Perkowski*, taken singularly or in combination, do not disclose the aforementioned feature of Dependent Claim 4. Accordingly, without conceding the propriety of the asserted combination, the asserted combination of *Borecki* and *Perkowski* is likewise deficient, even in view of the knowledge of one of ordinary skill in the art.

Additionally, Dependent Claim 5 recites a method of Claim 4 wherein the user stores a plurality of coded information, each associated with unique routing, such that the reading of one of one or more credit cards of the user cause the user computer to connect to the corresponding specific and unique credit card company server over the network. *Borecki* and *Perkowski*, taken singularly or in combination, do not disclose the storing a plurality of coded information. As such, *Borecki* and *Perkowski*, taken singularly or in combination, do not disclose the aforementioned feature of Claim 5.

#### **E. Dependent Claim 7 as rejected by the combination of Borecki et al. and Perkowski.**

Regarding Claim 7, the Examiner states in the Final Office Action dated October 5, 2006:

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<sup>125</sup> See *Perkowski*, Col. 19, lines 12-55.

<sup>126</sup> See *Perkowski*, Col. 15, lines 60-63 (also referenced hereinabove with respect to Independent Claim 1).

As to claim 7, Borecki-Perkowski teach (*sic*) the use of a computer display at the user location (Borecki, page 2, paragraph 0034-0035 and page 3, paragraph 0040).<sup>127</sup>

Claim 7 depends from, and further limits, Independent Claim 1. This dependent claim is allowable for at least the same reasons as the claim from which it depends, as discussed above.

#### **F. Dependent Claims 9 and 11 as rejected by the combination of Borecki et al. and Perkowski.**

Regarding Claims 9 and 11, the Examiner states in the Final Office Action dated October 5, 2006:

As to claims 9 and 11, Borecki-Perkowski teach (*sic*) a method for accessing personal information from a remote location on a network, as applied to claim 1 above, comprising the steps of:

reading at a user location on the network a unique information access code disposed on a portable access device that is carried by a user, which unique information access code is associated with routing information on the network to the remote location and also with personal information at the remote location of a user that is associated with the portable access device (Perkowski, col. 3, line 63 - col. 4, line 4; col. 5, lines 19-26 and col. 19, lines 12-55);

accessing the remote location in accordance with the routing information (Perkowski, col. 19, lines 12-55);

transmitting to the remote location the unique information access code (Borecki, Figure 2A and page 2, paragraph 0034-0035 and page 3, paragraph 0039); and

at the remote location, receiving the unique information access code and accessing personal information associated therewith and forwarding the personal information back to the user location for viewing by the user (Borecki, Figure 2A and page 2, paragraph 0034-0035 and page 3, paragraph 0039); the step of forwarding comprising:

sending from the remote location a request for personal identification after determining that there is contained in the database local to the remote location personal information associated with the unique information access code (Borecki, paragraphs 0034-0035),

entering the personal identification information at the user location (Borecki, paragraphs 0034-0035 and 0039-0040); and

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<sup>127</sup> See Final Office Action dated October 5, 2006, at page 5.

in response to input of a personal identification information by the user, returning the personal information to the user location (Borecki, paragraphs 0039-0040).<sup>128</sup>

Independent Claim 9 recites a method for accessing personal information from a remote location on a network. The first step of Independent Claim 9 is to read, at a user location on the network, a unique information access code disposed on a portable access device that is carried by a user, which unique information access code is uniquely associated with both routing information on the network to the remote location and with personal information at the remote location of a user that is associated with the portable access device, wherein the association of the remote location with the unique information access code is unique to such unique information access code such that only that single remote location contains the associated personal information. The Examiner cites *Perkowski* at col. 3, line 64 – col. 4, line 4, col. 5, lines 19-26 and col. 19, lines 12-55 to provide this teaching. As stated hereinabove with respect to Independent Claim 1, *Perkowski* merely discloses a UPC on a product that is used in a translation database to retrieve URLs registered with that UPC. *Perkowski* contains no disclosure that the product is a *portable access device* or that the UPC is uniquely associated with both routing information on the network to a remote location and with personal information, of the user at the remote location. Further, *Perkowski* contains no disclosure that the product would be associated with the user. As such, the UPC is not a unique information access code disposed on a portable access device carried by a user. Thus, *Perkowski* cannot reasonably be interpreted to disclose the aforementioned feature of Independent Claim 9.

Further, Independent Claim 9 recites obtaining the routing information from a database by comparing the unique information access code in a matching operation to a record in the database to determine if there exists in the record a pre-association between the unique information access code and at least one routing information and, if so, then allowing access to such matching routing information; and accessing the remote location in accordance with the obtained routing information. The Examiner cites *Perkowski*, col. 19, lines 12-55 for this teaching. *Perkowski* does disclose that the UPC, though not conceded as a unique information access code, is used to return URLs registered with the UPC and that the URLs can be selected for access to a remote location.

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<sup>128</sup> See Final Office Action dated October 5, 2006, at pages 5 and 6.

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Next, Independent Claim 9 recites transmitting to the remote location, the unique access code. The Examiner provides *Borecki*, Figure 2A and page 2, paragraphs 0034-0035, and page 3, paragraph 0039 for this teaching. As stated hereinabove, *Borecki* expressly teaches away from the use of a single code as *Borecki* requires 3 separate entries (a member number, User ID and password) to ensure security and privacy. *Borecki* does not disclose the transmission of a unique access code to the remote server. Thus, *Borecki* cannot reasonably be interpreted to disclose the aforementioned feature of Independent Claim 9.

Further, Independent Claim 9 recites, at the remote location, receiving the unique information access code and accessing personal information associated therewith and forwarding the personal information back to the user location for viewing by the user. Thereafter, Independent Claim 9 recites that the user enters the personal identification information at the user location. Finally, in response to input of the personal identification information by the user, the remote location returns the personal information to the user location.

The Examiner contends that the UPC information in *Perkowski* can be combined with the *Borecki* account information. Neither *Borecki* nor *Perkowski*, taken singularly or in combination, teaches a unique access code on a portable access device that, in response to reading the unique access code, a connection is made to a remote location and the unique access code is transmitted to the remote location. Accordingly, without conceding the propriety of the asserted combination, the asserted combination of *Borecki* and *Perkowski* is likewise deficient in teaching accessing an intermediate location in response to scanning the UPC and transmitting the extracted information to the intermediate location accessed as a result of the scanning operation, even in view of the knowledge of one of ordinary skill in the art.

#### **G. Dependent Claim 10 as rejected by the combination of Borecki et al. and Perkowski.**

Regarding Claim 10, the Examiner states in the Final Office Action dated October 5, 2006:

As to claim 10, Borecki-Perkowski teach the method wherein the network is a global communication network (Borecki, page 2, paragraph 003 1).<sup>129</sup>

Claim 10 depends from, and further limits, Independent Claim 9. This dependent claim is allowable for at least the same reasons as the claim from which it depends, as discussed above.

#### **H. Dependent Claim 12 as rejected by the combination of Borecki et al. and Perkowski.**

Regarding Claim 12, the Examiner states in the Final Office Action dated October 5, 2006:

As to claim 12, Borecki-Perkowski teach the method wherein the step of accessing comprises the steps of:

in response to the step of reading, accessing an intermediate location on the network remote from the user location (Perkowski, col. 3, line 63 - col. 4, line 4; col. 5, lines 19-26 and col. 19, lines 12-55);

transmitting the unique information access code to the intermediate location from the user location (Perkowski, col. 3, line 63 - col. 4, line 4; col. 5, lines 19-26 and col. 19, lines 12-55);

the intermediate having contained thereat a database with associations between a plurality of unique information access codes and remote locations on the network (Perkowski, col. 3, line 63 - col. 4, line 4; col. 5, lines 19-26 and col. 19, lines 12-55);

comparing the received unique personal access code with the stored personal access code (Perkowski, col. 3, line 63 - col. 4, line 4; col. 5, lines 19-26 and col. 19, lines 12-55);

if a match is found, returning the matched remote location information to the user location (Perkowski, col. 3, line 63 - col. 4, line 4; col. 5, lines 19-26 and col. 19, lines 12-55); and

utilizing the returned remote location information from the intermediate location to access the remote location (Perkowski, col. 3, line 63 - col. 4, line 4; col. 5, lines 19-26 and col. 19, lines 12-55).<sup>130</sup>

Claim 12 depends from, and further limits, Independent Claim 9. This dependent claim is allowable for at least the same reasons as the claim from which it depends, as discussed above. Dependent Claim 12 recites a method of Claim 9, wherein the step of obtaining and accessing comprises the steps: of *in response to the step of reading*, accessing an intermediate location on

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<sup>129</sup> See Final Office Action dated October 5, 2006, at page 6.

<sup>130</sup> See Final Office Action dated October 5, 2006, at pages 6 and 7.

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the network remote from the user location; *transmitting the unique information access code* to the intermediate location from the user location; the intermediate location having contained thereat the database with associations between a plurality of unique information access codes and associated unique routing information to associated remote locations on the network; comparing the received unique information access code with the stored unique information access codes; if a match is found, returning the matched unique routing information to the user location; and utilizing the returned unique routing information from the intermediate location to access the remote location. Claim 12 includes the limitations of accessing an intermediate location on the web in response to the step of extracting and transmitting the unique information access code to the intermediate location, as found in Independent Claim 1. Accordingly, without conceding the propriety of the asserted combination, the asserted combination of *Borecki* and *Perkowski* is likewise deficient in teaching accessing an intermediate location in response to scanning the UPC and transmitting the extracted information to the intermediate location accessed as a result of the scanning operation, even in view of the knowledge of one of ordinary skill in the art.

### **I. Conclusion - Claims 2-5, and 7-12 as rejected by the combination of Borecki et al. and Perkowski.**

The Examiner maintains the 35 U.S.C. § 103(a) rejection of Claims 2-5 and 7-12 as rejected by the combination of *Borecki* and *Perkowski*. As stated hereinabove, Claims 2-5 and 7-8 depend from, and further limit Independent Claim 1. These claims are allowable for at least the reasons as the claim from which they depend. Additionally, the combination of *Borecki* and *Perkowski* fails to teach all the limitations found in Claims 2-5 and 7-8 as outlined above.

In respect to Claims 9-12, Independent Claim 9 contains limitations as found in Independent Claim 1. Therefore, Independent Claim 9 equally is allowable for the reasons outlined with respect to Independent Claim 1. Also, as stated hereinabove, Claims 10-12 depend from, and further limit, Independent Claim 9. These claims are allowable for at least the reasons as the claim from which they depend.

Further, the Examiner has provided no articulated reasoning why one skilled in the art would make such a combination. Somehow the Examiner is bridging the gap from a 12-digit

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code provided on a product for purchase that can be registered with a URL in a translation database and a member number, User ID and password used to access a personal account, to a system wherein a unique access code on a portable access device is used to provide routing information associated with the remote location on the network and the location of the personal account information stored at the remote location information. The combination provided by the Examiner would somehow use the 12-digit UPC number as member number disposed on a credit card (as found in Claim 11 of the instant application), uniquely associated with personal account information of the purchaser of the product, that, when scanned, provides a connection from the purchaser's computer to a remote location on the network; then, transmitting the scanned information to the remote location which, in response, prompts the purchaser to enter personal identification information in order to receive the personal account information regarding the purchaser that is stored at the remote location. However, the Examiner has provided no articulated reasoning how this gap is bridged. As such, the combination of *Borecki* and *Perkowski* does not anticipate or render obvious Appellants' present inventive concept, as set forth in Claims 9 and 11.

**J. Dependent Claim 6 as rejected by the combination of Borecki-Perkowski and Brook et al.**

Regarding Claim 6, the Examiner states in the Final Office Action dated October 5, 2006:

As to claim 6, *Borecki-Perkowski* teach (*sic*) the invention substantially as claimed. However, *Borecki-Perkowski* does not explicitly teach a wireless scanner. In the same field of endeavor, *Brook* teaches a wireless barcode scanner (*Brook*, figure 1 and col. 3, line 6 - col. 4, line 41). It would have been obvious to one having ordinary skill in the art at the time the invention was made to have incorporated the wireless barcode scanner, as taught by *Brook*, into the system of *Borecki-Perkowski*, for the purpose of increasing user convenience and mobility.<sup>131</sup>

The Examiner provides *Brook* to cure the deficiencies of *Borecki-Perkowski*. *Brook* teaches a drug tracking system and method for use in hospitals, pharmacies, etc.<sup>132</sup> *Brook*

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<sup>131</sup> See Final Office Action dated October 5, 2006, at pages 7 and 8.

<sup>132</sup> See *Brook*, Abstract.

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provides a portable access scanner/printer that can communicate via an RF link to a Personal Computer based server.<sup>133</sup>

Claim 6 recites a method of Claim 1, wherein the step of resolving utilizes a reading device which is a wireless scanner which transmits the coded information to a user computer at the user location via a receiving device operatively connected to the user computer. The secondary citation to *Brooks* relates to a drug tracking system for hospitals and pharmacies and is cited for its alleged disclosure of a wireless bar code scanner. Appellants submit that *Brooks* does not add anything that would remedy the aforementioned deficiency in *Borecki-Perkowski*. Claim 6 depends from, and further limits Independent Claim 1. This claim is allowable for at least the reasons as the claim from which it depends, as discussed above. Accordingly, favorable reconsideration and withdrawal of the rejection of Claim 6 under 35 U.S.C. §103 are respectfully requested.

#### **K. Independent Claim 1 as rejected by the combination of Perkowski and Janning et al.**

The Examiner additionally rejects Claims 1 and 9 as being unpatentable over the combination of *Perkowski* and *Janning*. The Examiner states in the Final Office Action dated October 5, 2006:

As to claims 1 and 9, *Perkowski* teaches the invention substantially as claimed. *Perkowski* teaches a system and method of accessing information associated with a user over a global communication packet-switched network, comprising the steps of:

at a user location disposed on the network, resolving a machine-resolvable code (MRC) having coded information contained therein and disposed on an object, the coded information having no personal information contained therein relating to the user (*Perkowski*, col. 3, line 63 - col. 4, line 4; col. 5, lines 19-26 and col. 19, lines 38-40);

extracting coded information from the MRC, the coded information associated with routing information that is associated with both the personal information of the user and a company server (*Perkowski*, col. 19, lines 12-55);

in response to the steps of resolving and extracting, obtaining the routing information to the server associated with the extracted coded information (*Perkowski*, col. 19, lines 12-55);

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<sup>133</sup> See *Brook*, Col. 5, lines 17-67; and Col. 6, lines 1-43.

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connecting the user location to the company server across the network over a determined route in accordance with the routing information such as a known URL (Perkowski, col. 19, lines 12-55);

transmitting the information to the specific and unique company server over the network (Perkowski, col. 19, lines 12-55);

using the information at the specific and unique company server to determine the information associated with the customer information from the company server, to the user location (Perkowski, col. 3, line 63 - col. 4, line 4; and col. 19, lines 38-40); and

presenting the information to the user at the user location (Perkowski, col. 3, line 63 - col. 4, line 4; col. 5, lines 19-26 and col. 19, lines 38-40).<sup>134</sup>

The Examiner states that *Perkowski* teaches the invention *substantially as claimed*, providing *Janning* to teach only that the information is credit card information. As such, the Examiner contends that *Perkowski* teaches a method of accessing personal account information of a credit card associated with a user over a global communication packet-switched network, comprising the steps of: at a user location disposed on the network, resolving a machine-resolvable code (MRC) having coded information contained therein, the coded information having no personal information contained therein relating to the user or routing information over a network; extracting the coded information from the MRC, the coded information associated with routing information that is associated with both the personal account information of the user and a specific and unique server having stored thereat the personal account information of the user; in response to the steps of resolving and extracting, obtaining the routing information to the server associated with the extracted coded information; connecting the user location to the specific and unique server across the network over a determined route in accordance with the obtained routing information; transmitting the extracted coded information to the specific and unique server over the determined route during the step of connecting; using the transmitted coded information at the specific and unique server to determine the personal account information associated with the extracted coded information; returning the determined personal account information from the specific and unique server to the user location; and presenting the determined personal account information to the user at the user location. However, this is inconsistent with the Examiner's 35 U.S.C. § 103(a) rejection of Claims 1 and 9 as being

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<sup>134</sup> See Final Office Action dated October 5, 2006, at pages 8 and 9.

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unpatentable over the combination of *Borecki* and *Perkowski* wherein the Examiner provided *Borecki* to teach:

... a system and method of accessing personal account information of a credit card associated with a user over a global communication packet-switched network, comprising the steps of:

connecting a user location to the specific and unique credit card company server across the network in accordance with a known URL (*Borecki*, Figure 2A and page 2, paragraph 0034-0035);

transmitting the account information to the specific and unique credit card company server over the network (*Borecki*, Figure 2A and page 2, paragraph 0034-0035 and page 3, paragraph 0039);

using customer account information at the specific and unique credit card company server to determine the personal account information associated with the customer account information from the credit card company server, to the user location (*Borecki*, page 3, paragraph 0040); and

presenting the information to the user at the user location (*Borecki*, page 2, paragraph 0034-0035 and page 3, paragraph 0040).<sup>135</sup>

Applicant submits that neither *Perkowski* nor *Janning* discloses at least the aforementioned feature of Independent Claim 1. As stated hereinabove, *Perkowski* provides a method and system for finding and serving consumer product-related information on the Internet.<sup>136</sup> *Perkowski* is directed towards the concept of providing an interface to a user to allow that user to search information regarding either a product having an associated Universal Product Code (UPC) or Universal Product Number (UPN) or information regarding products associated with the trademark (noting this association is not disclosed as being on a product or brochure), there are provided two methods of operation.<sup>137</sup> Each of these systems utilizes a browser programmed as the GUI-based interface for the user. The two independent modes of operation are the “Internet Product Service Information (IPSI) Find Mode” (and the “UPSN Search Mode” system.<sup>138</sup> The user may be provided with an icon on their local internet browser.<sup>139</sup> Alternatively, the user selects an icon within an internet browser on their computer.<sup>140</sup> Upon

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<sup>135</sup> See Final Office Action, mailed February 14, 2007, pages 2-3.

<sup>136</sup> See *Perkowski*, Abstract.

<sup>137</sup> See *Perkowski*, Col 3, lines 55-67; and Col. 4, lines 1-14.

<sup>138</sup> See *Perkowski*, starting at Col 18, line 55 in the section entitled “Operation of the IPSI Finding System and Method.”

<sup>139</sup> See *Perkowski*, Col 8, lines 25-36.

<sup>140</sup> See *Perkowski*, Col 8, lines 37-45.

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selection of the icon, the user is connected through the internet to the IPSI Web-site.<sup>141</sup> The web-site may be accessed by a known URL, such as <http://www.ipsi.com>.<sup>142</sup> Regardless of whether the user is required to access the IPSI web-site first or is provided an icon on their browser, the user must select the IPSI finder button to initiate the functionality of the *Perkowsky* system.<sup>143</sup> Selecting the IPSI finder button transmits entered UPC information to the IPSI server located on the internet.<sup>144</sup> When selecting the IPSI finder button, the user enters the product UPC information.<sup>145</sup> The UPC is encoded with a 12 digit number representing a manufacturer (first 6 digits), product (next 5 digits), and a check digit. The 12 digit, human readable number is printed on the bottom of the UPC.<sup>146</sup> A user may manually enter a registered product's UPN (e.g., the UPC 12 digit numerical string) into a dialogue box of an Internet browser or Internet application tool.<sup>147</sup> The user may also scan the UPSN (Universal Product / Service Number – i.e., UPC) with a bar code symbol scanner.<sup>148</sup> Regardless of the method of entry of the UPC, the system (i.e., the IPSI server) performs a query based upon the UPC to determine if a corresponding URL for the product/manufacturer exists in an IPSI Registrant Database.<sup>149</sup> If so, the URL, or list of URL's is provided to the user.<sup>150</sup> Thereafter, the user selects a URL corresponding to a web-site the user desires to access.<sup>151</sup>

As discussed hereinabove, *Perkowsky* does not teach an MRC having encoded information associated with routing information associated with *both* personal account information and a specific unique server where the personal account information is stored. Additionally, *Perkowsky* does not teach obtaining routing information *in response* to extracting coded information from the MRC. Further, *Perkowsky* teaches that the user computer connects to the IPSI Server in response to the user selecting the IPSI Finder button, wherein the 12-digit UPC code (whether entered or scanned) is transmitted to the IPSI server. Thereafter, the IPSI server returns a URL, or URLs, registered with the 12-digit UPC number. *Perkowsky* contains no

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<sup>141</sup> See *Perkowsky*, Col 8, lines 45-55.

<sup>142</sup> See *Perkowsky*, Col 8, lines 55-60.

<sup>143</sup> See *Perkowsky*, Col 8, lines 64-67; Col. 15, lines 53-60.

<sup>144</sup> See *Perkowsky*, Col 8, lines 39-55; Col. 15, lines 55-59.

<sup>145</sup> See *Perkowsky*, Col 15, lines 55-59.

<sup>146</sup> See *Perkowsky*, Col 12, lines 3-19.

<sup>147</sup> See *Perkowsky*, Col 19, lines 23-28.

<sup>148</sup> See *Perkowsky*, Col 19, lines 38-40.

<sup>149</sup> See *Perkowsky*, Col 15, lines 60-67.

<sup>150</sup> See *Perkowsky*, Col 15, lines 60-67; and Col. 19, lines 41-44.

<sup>151</sup> See *Perkowsky*, Col 19, lines 45-55.

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teaching, suggestion, or motivation for extracting coded information from an MRC to obtain routing information to a server that contains personal account information of the user; then transmitting, to the server, the extracted information to determine and return the personal account information of the user. *Perkowsky* teaches, and is limited to teaching, entering a 12-digit UPC number into a browser system at a user computer; selecting an IPSI Find mode to connect to an IPSI server; accessing a database at the IPSI server; obtaining URLs registered with the 12-digit UPC; returning the URLs to the user computer; whereby the user can select a URL to connect to for viewing product information. Thus, *Perkowsky* cannot reasonably be interpreted to disclose the aforementioned features of Independent Claim 1.

Additionally, *Perkowsky* does not disclose that the information is disposed on a credit card and that the information retrieved is credit card related information. The Examiner concedes that the primary citation to *Perkowsky* does not disclose credit card related information or a specific and unique credit card server. The Examiner states:

However, *Perkowsky* does not explicitly teach the information is credit card information and personal information is credit card related information. In the same field of endeavor, *Janning* teaches a system and method for accessing user credit card related information, such information having no personal information contained therein relating to the user, and using this information to access user's personal credit card account online (See *Janning*, Abstract and col. 28, line 1 - col. 29, line 4).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have incorporated the credit card access system of *Janning* into the automated information access system of *Perkowsky* for the purpose of easily and efficiently obtaining user's credit information while maintaining anonymity as well as convenience.<sup>152</sup>

Thus, the Examiner is utilizing *Janning* to teach a system and method for accessing user credit card related information wherein the information has no personal information contained therein relating to the user and then this information is used to access the user's personal credit card account online. Accordingly, without conceding the propriety of the asserted combination, the asserted combination of *Perkowsky* and *Janning* is likewise deficient, even in view of the knowledge of one of ordinary skill in the art.

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<sup>152</sup> See Final Office Action dated October 5, 2006, at pages 8 and 9.

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The secondary citation to *Janning* relates to a cashless business transaction system.<sup>153</sup> A transaction controller will determine whether billing information is included in the radio signal.<sup>154</sup> The controller determines whether billing information is included in the radio signal by comparing digital information provided by the receiver to stored account numbers in a centralized computer database.<sup>155</sup> In a preferred example, there is described the situation where a string of bits received from the receiver are determined whether to correspond to a credit card account number, a debit account number or some other bank account number and whether these bits contain account validity information, such as a credit card expiration date, etc.<sup>156</sup>

In order to accomplish the functions described in *Janning*, some type of relational database must be used or associated therewith. As such, all that *Janning* teaches, and is limited to teaching, is that some kind of code can be obtained and credit card information can be looked up. This is no different than *Borecki*, wherein the user inputs a User ID and password and the User ID and password is utilized to obtain an association with some type of account information either directly or indirectly. Thus, *Janning* does not provide a disclosure that remedies the aforementioned, conceded deficiency in the primary citation to *Perkowski*.

#### **L. Conclusion – Independent Claims 1 and 9 as rejected by the combination of Perkowski and Janning et al.**

The combination of *Perkowski* and *Janning* does not disclose or suggest that an MRC would be coded such that the coded version thereof can first be utilized to determine a location to a destination website and, after the destination website is decoded, to then transfer the information to the destination website to access account information. The claims of the instant application require the extracted code associated with a destination website address for a secure server and also associated with user account information at the destination web server. In *Perkowski*, the bar code is a UPC number registered with a website and there is no reason to extract the encoded information in order to then determine the location to the destination website and, thereafter, transfer this decoded information to the destination website and access information associated therewith. Thus, an association must exist between both the destination

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<sup>153</sup> See *Janning*, Abstract.

<sup>154</sup> See *Janning*, Col. 28, lines 27-29.

<sup>155</sup> See *Janning*, Col. 28, lines 30-33.

<sup>156</sup> See *Janning*, Col. 28, lines 34-52.

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website and the user account information, which association is not suggested or disclosed in either *Perkowski* or *Janning* or in the combination thereof. Since the information in *Janning* only relates to credit card information and the information in the UPC in *Perkowski* only enters the 12-digit number into a browser to be used, after a user connects to the system, by a server to return links that registered to the 12-digit number, the question is “Why would one skilled in the art want to use a 12-digit number, encoded into a UPC of a product to retrieve the credit card information as in the *Janning* system? The Examiner states that one skilled in the art would combine *Perkowski* with *Janning* for the purpose of easily and efficiently obtaining user’s credit information while maintaining anonymity as well as convenience. However, there is no motivation or suggestion that would in any way lead one skilled in the art to combine such. Combining *Perkowski* with *Janning* still would require the user to somehow identify their personal account information at the credit card server. Thus, *Janning* does not provide a disclosure that remedies the aforementioned, conceded deficiency in the primary citation to *Perkowski*. As such, *Perkowski* and *Janning*, taken singularly or in combination, do not anticipate or render obvious Appellants’ present inventive concept, as set forth in Claim 1.

### **1. KSR Test:**

Under the *KSR* Test, the question would be whether *Perkowski* could be varied in a predictable manner under this dicta to obtain routing information associated to both personal account information and a specific and unique credit card server, in response to extracting information from an MRC on a credit card, wherein the personal account information is stored at the specific and unique credit card server. *Perkowski* associates a particular website, or group of websites, to a particular product for purchase. In Claim 1, the MRC performs two steps in response to the step of extracting the coded information: first, to obtain routing information to the specific and unique server; second, connect to the specific and unique credit card server in accordance with the obtained routing information, and in response to transmitting the extracted information, determining the personal account information of the user stored at the specific and unique credit card server. If the UPC information were used with the *Janning* system, there is no indication that the MRC would be disposed on a credit card or that the extracted information could provide routing information associated to both the personal account information and the specific and unique credit card server, or connect the user to the specific and unique credit card

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server in accordance with the associated routing information, if it existed. As such, there is no predictable variation of *Perkowsky* that would lead one skilled in the art to utilize the *Janning* credit card signals. When work is available in one field of endeavor, i.e., providing access to secure personal account information on a credit card server located on the Internet, there is no design incentive or other market force that would prompt a predictable variation of the *Perkowsky* reference to utilize credit card content for a purpose that is not useful or envisioned in *Perkowsky*. In summary, Appellants submit that the Examiner has failed to provide a *prima facie* case as to why the *Perkowsky* and *Janning* references, in combination, render obvious Appellants' present inventive concept, as defined by Claims 1 and 9. However, such assertion of a predictable variation has not been asserted by the Examiner during the prosecution. As such, Appellants have not been afforded the opportunity to introduce information into the record for the purpose of illustrating that work available in the field of endeavor associated with *Perkowsky* would cause one skilled in the art to combine the teachings of a teaching in the field of endeavor of either of *Janning* or any other reference in a predictable manner. Such evidence could have been provided by Applicant if such rejection had been made during the prosecution phase, which did not happen.

**M. Independent Claim 9 as rejected by the combination of Perkowsky and Janning et al.**

As stated hereinabove, Independent Claim 9 recites limitations as found in Independent Claim 1. As such, Independent Claim 9 is allowable for at least the same reasons as Independent Claim 1, as discussed above.

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### **VIII. Conclusion**

In Summary, Appellants submit that the references cited by the Examiner fail to provide a suggestion, motivation, or teaching for the various combinations because the text fails to illustrate “why” one skilled in the art would combine the references in the particular manner required to provide a predictable variation. Instead, the Examiner simply identifies particular components for each reference, combines them in a specific manner required by Appellants’ claimed invention, and then states that it would be obvious to one skilled in the art to do so. This is clearly hindsight based reasoning that contravenes the standards imposed by both the MPEP and the Federal Circuit, and Appellants respectfully submit that the cited combinations are improper for reasons detailed above and requests that the rejections under § 103 be withdrawn.

Respectfully submitted,

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## CLAIMS APPENDIX

Claim 1 A method of accessing personal account information of a credit card associated with a user over a global communication packet-switched network, comprising the steps of:

at a user location disposed on the network, -resolving a machine-resolvable code (MRC) having coded information contained therein and disposed on the credit card of the user, the coded information having no personal information contained therein relating to the user or routing information over a network;

extracting the coded information from the MRC, the coded information associated with routing information that is associated with both the personal account information of the user and a specific and unique credit card company server having stored thereat the personal account information of the user;

in response to the steps of resolving and extracting, obtaining the routing information to the credit card server associated with the extracted coded information;

connecting the user location to the specific and unique credit card company server across the network over a determined route in accordance with the obtained routing information;

transmitting the extracted coded information to the specific and unique credit card company server over the determined route during the step of connecting;

using the transmitted coded information at the specific and unique credit card company server to determine the personal account information associated with the extracted coded information;

returning the determined personal account information from the specific and unique credit card company server to the user location; and

presenting the determined personal account information to the user at the user location.

Claim 2 The method of Claim 1, wherein the MRC is optical indicia.

Claim 3 The method of Claim 2, wherein the optical indicia is a bar code.

Claim 4 The method of Claim 1, wherein the routing information in the step of obtaining is stored on a user computer at the user location such that the coded information in the step of extracting is used to obtain the corresponding routing information from the user computer.

Claim 5 The method of Claim 4, wherein the user computer stores a plurality of coded information each associated with unique routing information such that reading of the MRC of a

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select one of one or more credit cards of the user causes the user computer to connect to the corresponding specific and unique credit card company server over the network.

Claim 6        The method of Claim 1, wherein the step of resolving utilizes a reading device which is a wireless scanner which transmits the coded information to a user computer at the user location via a receiving device operatively connected to the user computer.

Claim 7        The method of Claim 1, wherein personal account information in the step of presenting is displayed on a computer display operatively connected to a user computer at the user location.

Claim 8        The method of Claim 1, wherein the routing information in the step of obtaining comprises a network address of the specific and unique credit card company server on the network and file path information which locates the personal account information of the user on the specific and unique credit card company server.

Claim 9        A method for accessing personal information from a remote location on a network, comprising the steps of:

reading at a user location on the network a unique information access code disposed on a portable access device that is carried by a user, which unique information access code is uniquely associated with both routing information on the network to the remote location and with personal information at the remote location of a user that is associated with the portable access device, wherein the association of the remote location with the unique information access code is unique to such unique information access code such that only that single remote location contains the associated personal information;

obtaining the routing information from a database by comparing the unique information access code in a matching operation to a record in the database to determine if there exists in the record a pre-association between the unique information access code and at least one routing information and, if so, then allowing access to such matching routing information;

accessing the remote location in accordance with the obtained routing information;

transmitting to the remote location the unique information access code; and

at the remote location, receiving the unique information access code and accessing personal information associated therewith and forwarding the personal information back to the user location for viewing by the user, the step of forwarded comprising:

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sending from the remote location a request for personal identification after determining that there is contained in the database local to the remote location personal information associated with the unique information access code,

entering the personal identification information at the user location, and

in response to input of a personal identification information by the user, returning the personal information to the user location.

Claim 10      The method of Claim 9, wherein the network is a global communication network.

Claim 11      The method of Claim 9, wherein the portable access device comprises a card that is typically utilized for credit transactions.

Claim 12      The method of Claim 9, wherein the step of obtaining and accessing comprises the steps of:

    in response to the step of reading, accessing an intermediate location on the network remote from the user location;

    transmitting the unique information access code to the intermediate location from the user location;

    the intermediate having contained thereat the database with associations between a plurality of unique information access codes and associated unique routing information to associated remote locations on the network;

    comparing the received unique information access code with the stored unique information access codes;

    if a match is found, returning the matched unique routing information to the user location; and

    utilizing the returned unique routing information from the intermediate location to access the remote location.

Claims 13 - 24 (Canceled)

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## EVIDENCE APPENDIX

- A. U.S. Patent Publication No. 2002/0016749 A1 to Borecki et al.
- B. U.S. Patent No. 6,064,979 to Perkowski
- C. U.S. Patent No. 6,170,746 B1 to Brook et al.
- D. U.S. Patent No. 6,446,049 B1 to Janning et al.
- E. Entered Amendment dated November 20, 2006
- F. *Alza Corporation v. Mylan Laboratories, Inc.*, 464 F.3d 1286 (Fed. Cir. 2006)
- G. *Anderson's-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57 (1969)
- H. *Cable Elec. Prods., Inc. v. Genmark, Inc.*, 770 F.2d 1031 (Fed. Cir. 1985)
- I. *Cross Medical Products, Inc. v. Metronics Sofamore Danek, Inc.*, 424 F.3d 1293, 1323 (Fed. Cir. 2005)
- J. *Dann v. Johnston*, 425 U.S. at 219, 226, 96 S.Ct. 1393, 47 L.Ed 2d 692 (1976)
- K. *In re Bond*, 910 F.2d, 831, (Fed. Cir. 1990)
- L. *In re Clinton*, 527 F.2d 1226 (C.C.P.A. 1976)
- M. *In re Dembiczak*, 175 F.3d 994, 998 (Fed. Cir. 1999)
- N. *In re Hiraro*, 535 F.2d, 67, (C.C.P.A. 1966)
- O. *In re Kahn*, 441 F.3d 977, 985 (Fed. Cir. 2006)
- P. *In re Regel*, 526 F.2d, 1399 (C.C.P.A. 1975)
- Q. *In re Rouffett*, 149 F.3d 1350, 1357
- R. *KSR International Co. v. Teleflex Inc, et al.*, 127 S. Ct. 1727 (2007)
- S. *Medichem S.A. v. Rolabo, S.L.*, 437 F.3d 1157, 1165 (Fed. Cir 2006)
- T. *Sakraida v. AGPro, Inc.*, 425 U.S. 273 (1976)
- U. *United States v. Adams*, 383 U.S. 39, 40 (1966)

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(54) METHODS AND SYSTEMS FOR NETWORK BASED ELECTRONIC PURCHASING SYSTEM

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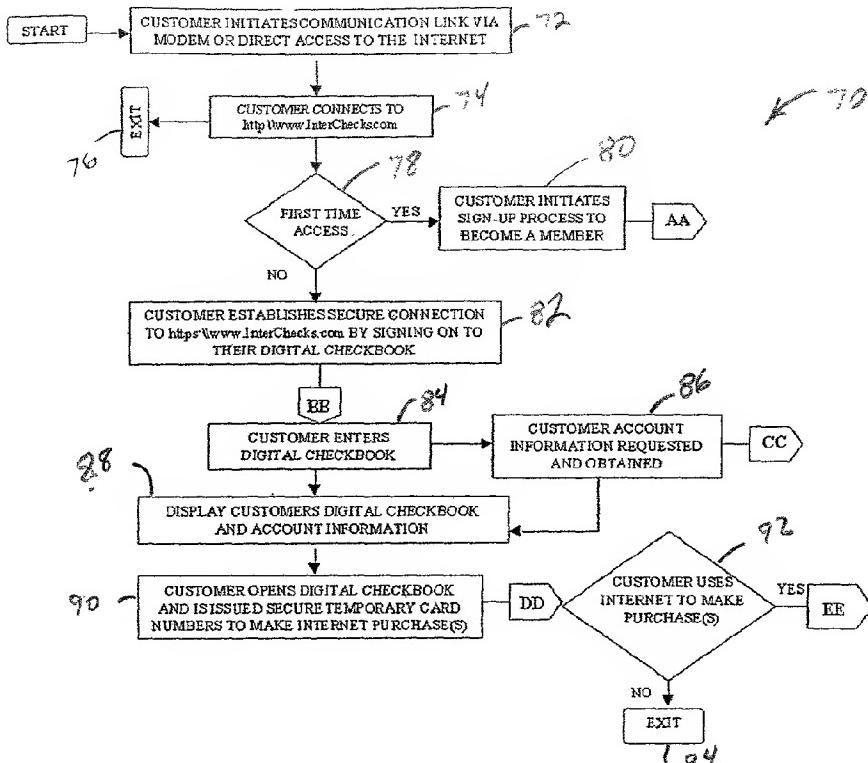
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(52) U.S. Cl. 705/26

## (57) ABSTRACT

A system and method for providing private and secure electronic purchasing via the Internet is disclosed. The system includes a central computer system which has capabilities to securely communicate with off-site remote access terminals via the Internet. The central computer system also has capabilities to securely communicate with trust bank computers, investment advisor computers and card processing computers. Provided are remote security access, account cross-referencing, omnibus accounting, and debit and credit card number selection. The central computer system is accessed using a computer via the Internet where a user activates a digital checkbook using the computer and sets transaction and time limits using the computer. User account information is accessed by the system, card numbers are selected by the system, and the user account is temporarily linked to the selected numbers by the system. The user never has to expose any personal information to the merchant.

## Related U.S. Application Data

(63) Non-provisional of provisional application No. 60/207,693, filed on May 26, 2000.



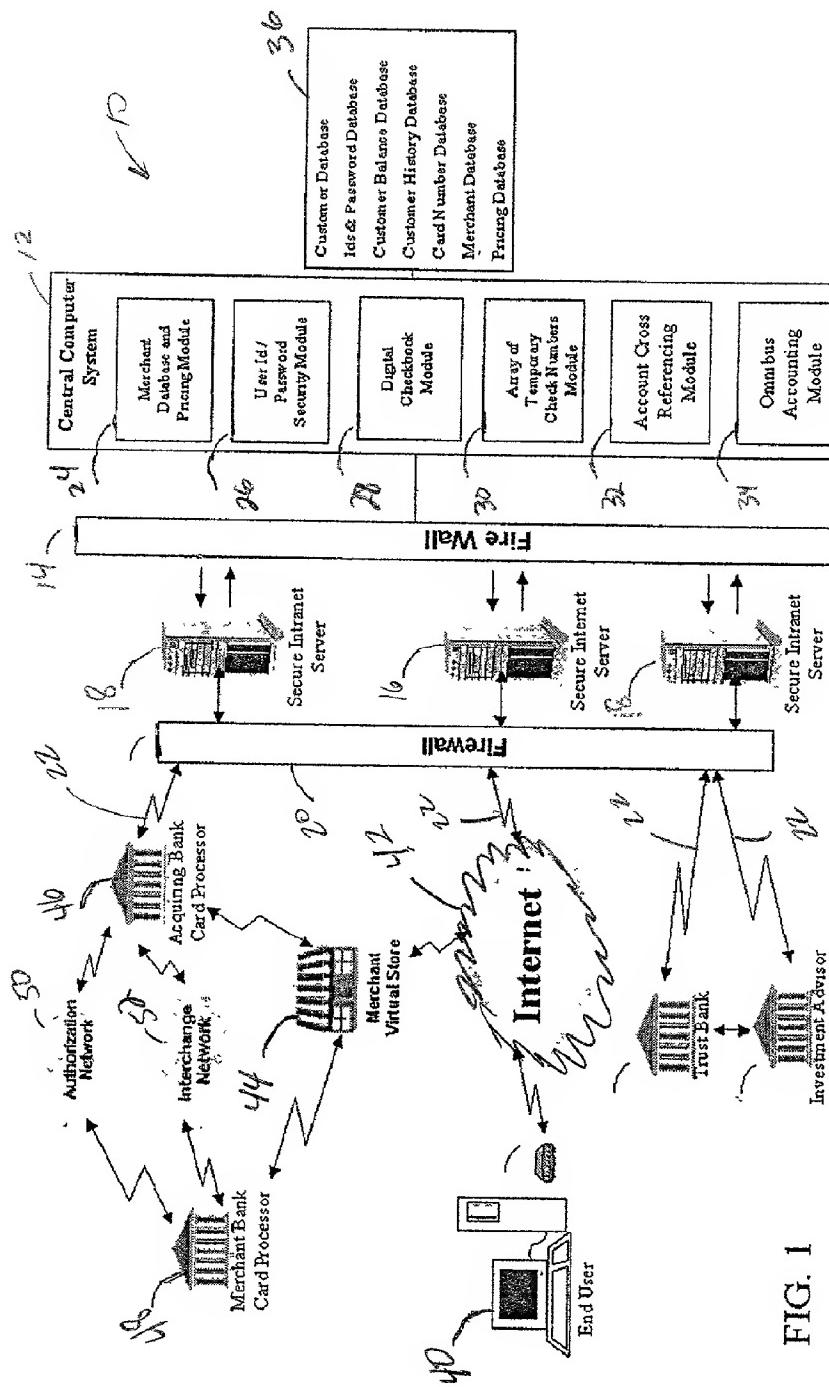
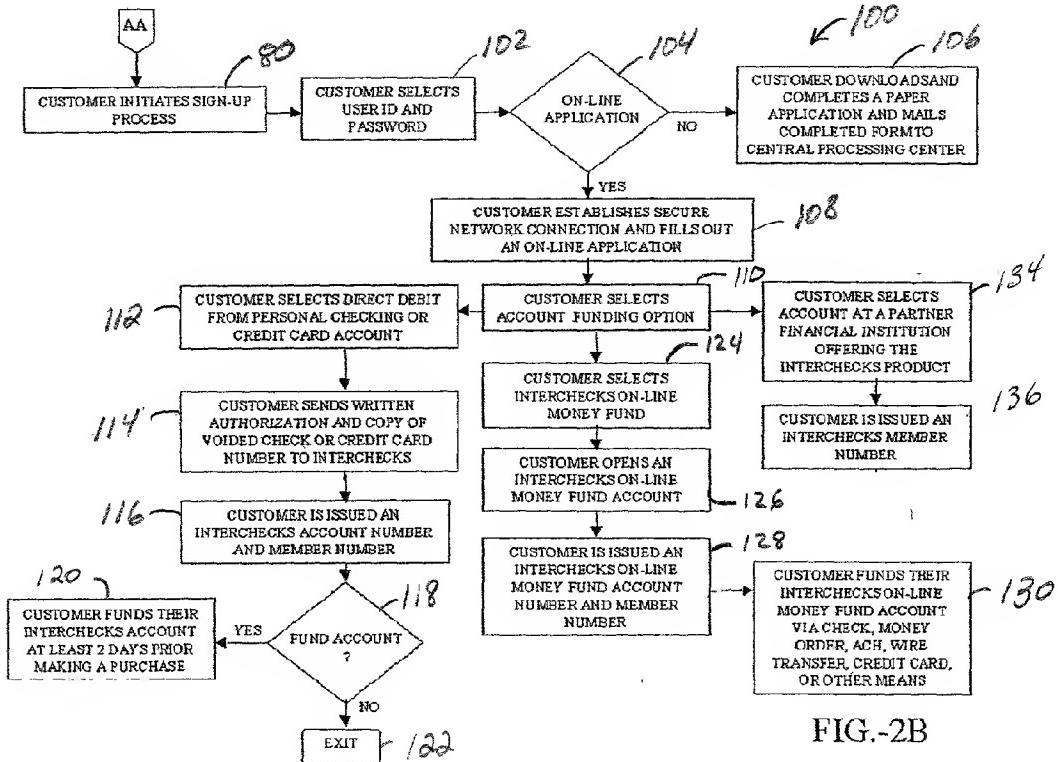
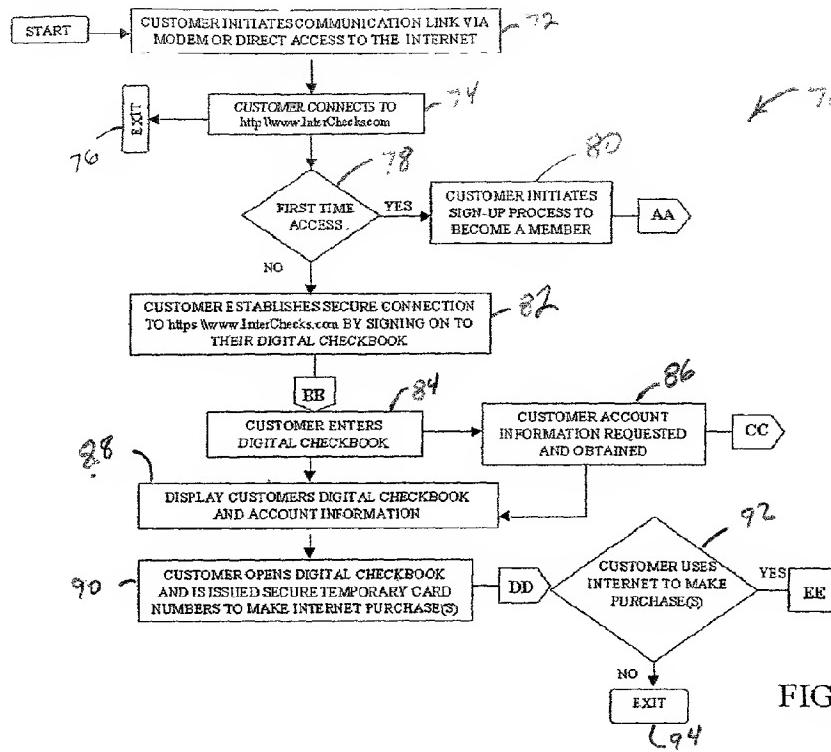


FIG. 1



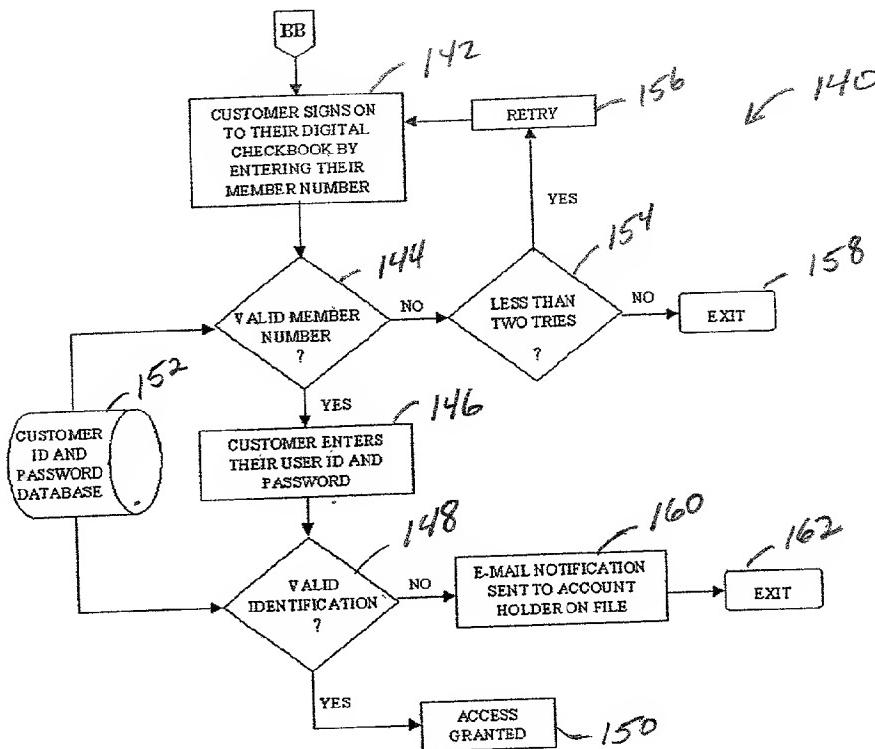


FIG.-2C

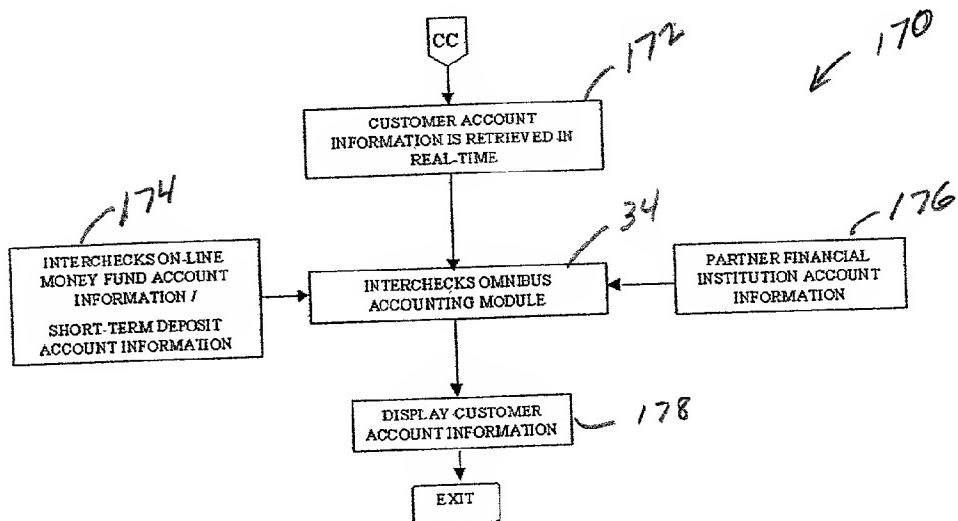


FIG.-2D

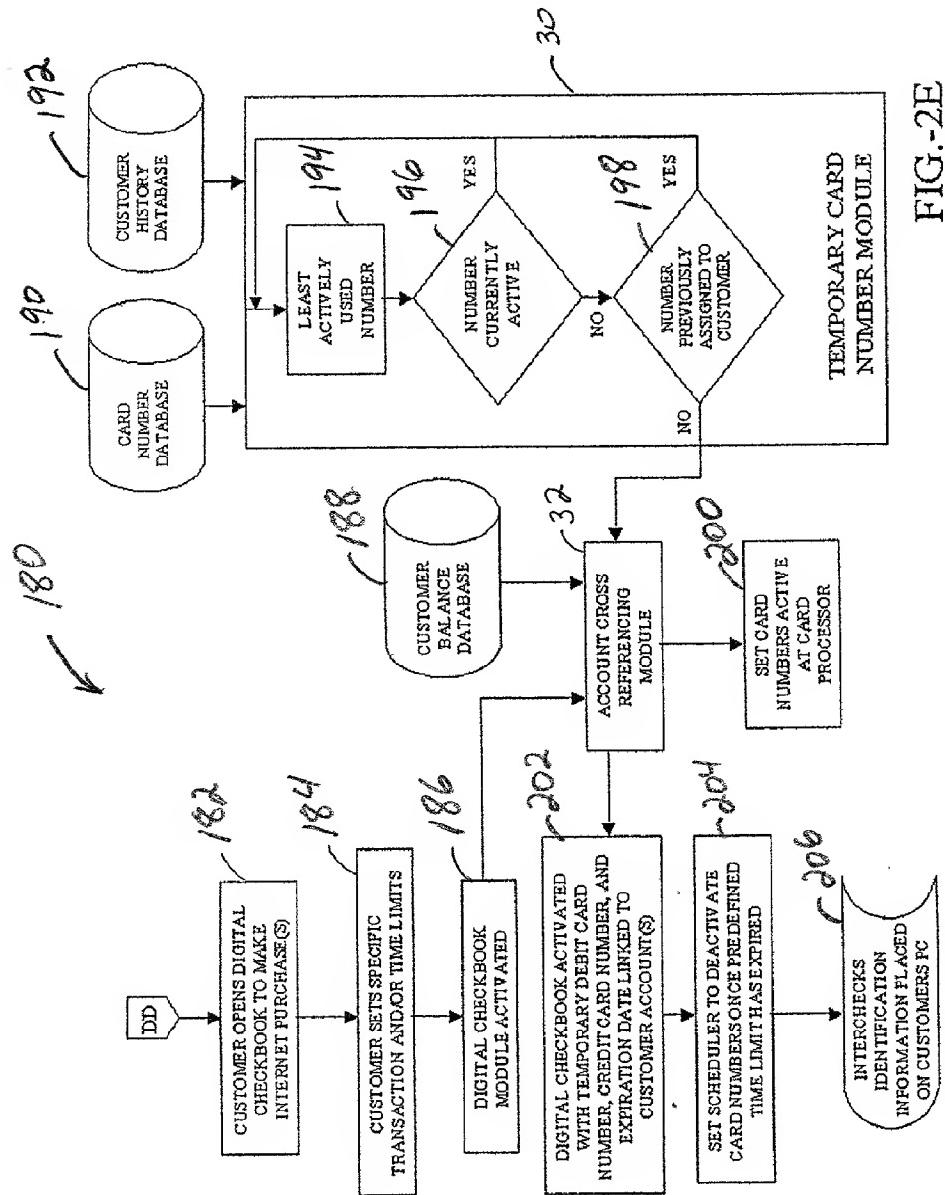


FIG.-2E

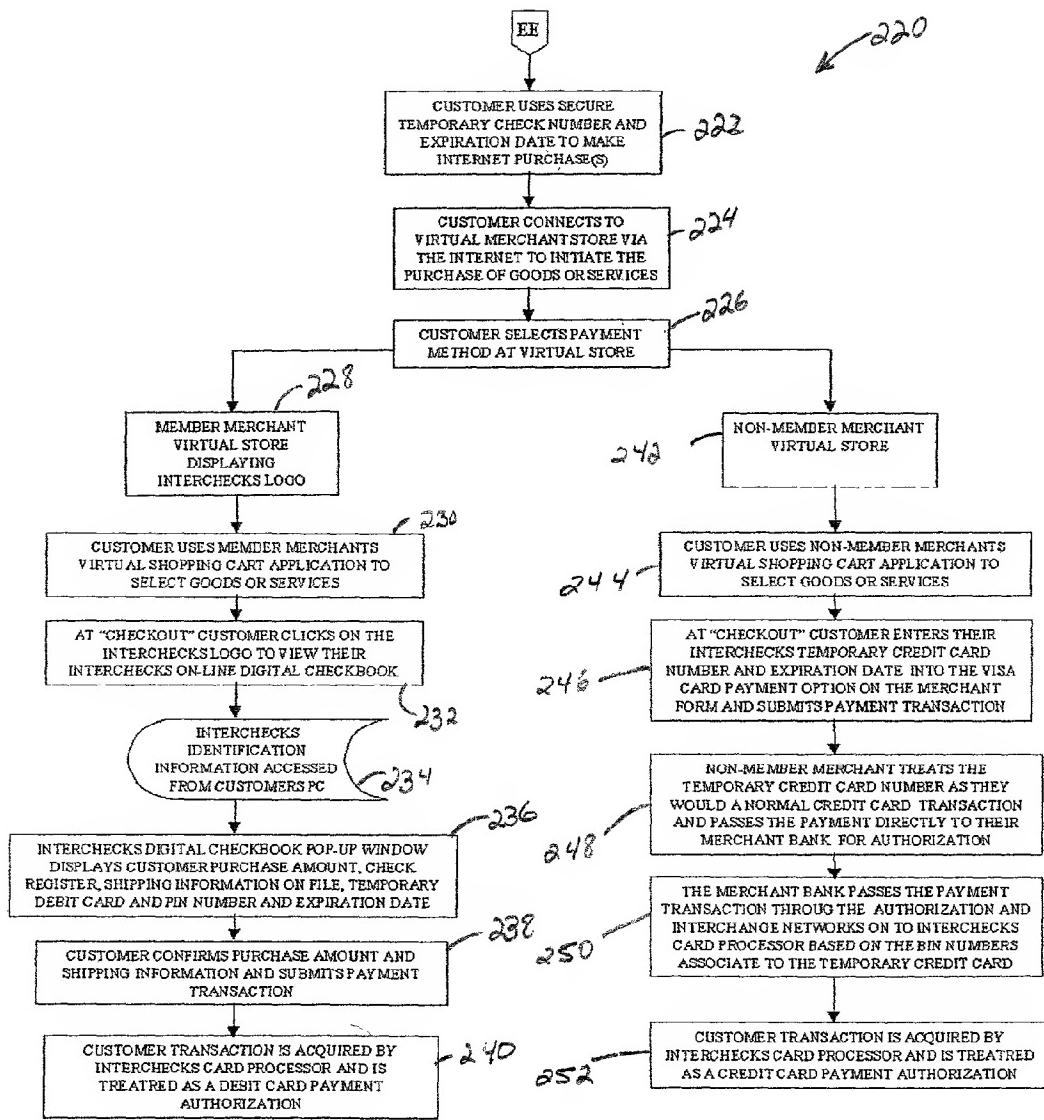


FIG. 2F

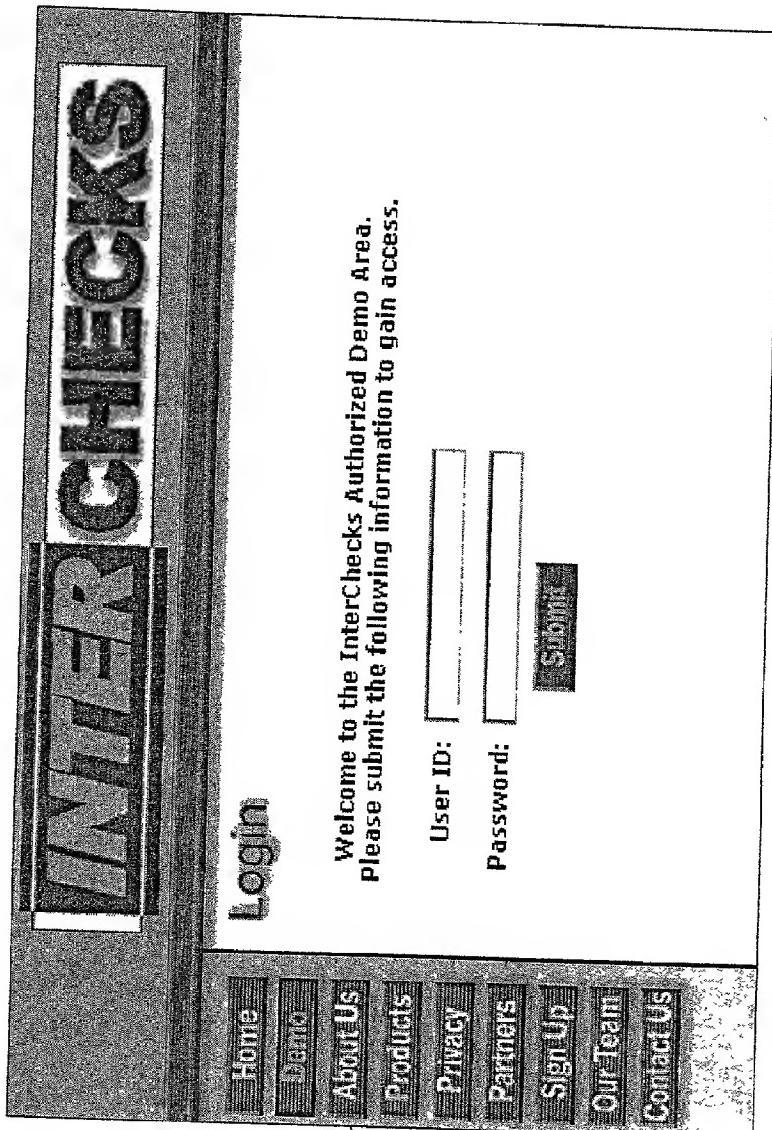


Fig. 3

302

310 ↴

**WIRE CHECKS**

**Sign-Up Now**

Please note that you must be at least 18 years old to register.

**CREATE LOGIN INFORMATION:**

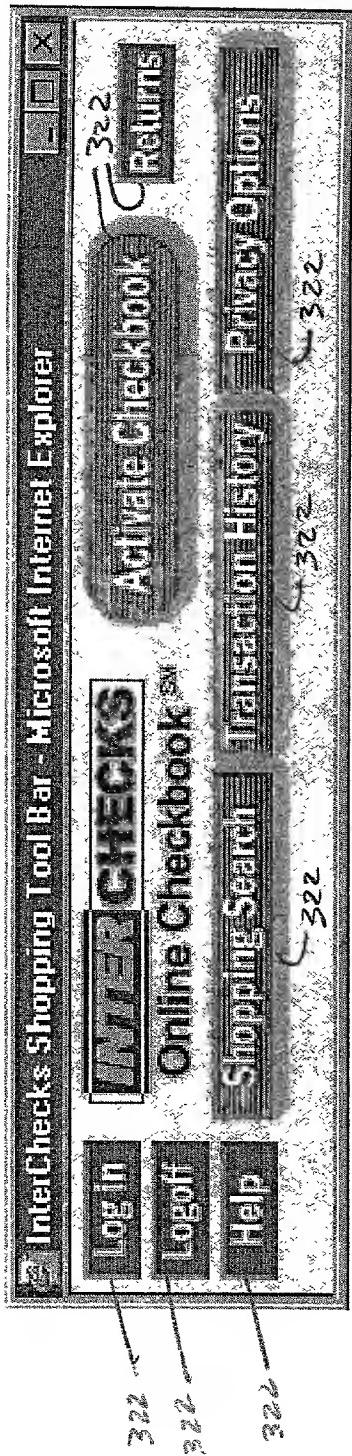
User Name :  312  
Password :   
Verify Password :

**ENTER REQUIRED CONTACT INFORMATION:**

First Name :  312  
Middle Initial :   
Last Name :   
Telephone No. :   
Email 1 :   
Email 2 :   
Institution :   
Card Type :   
Account No. :   
  


314 ↴

FIG. 4



✓ 330

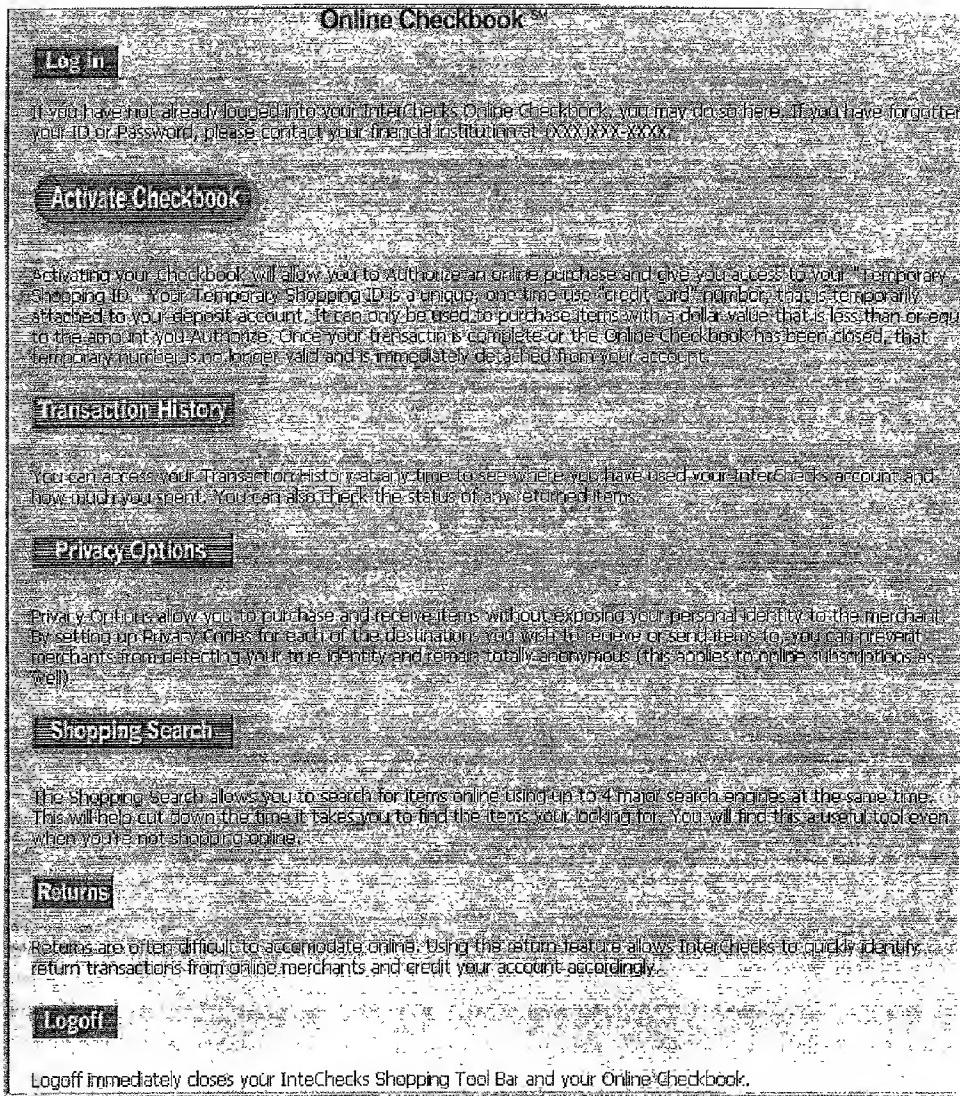


FIG. 6

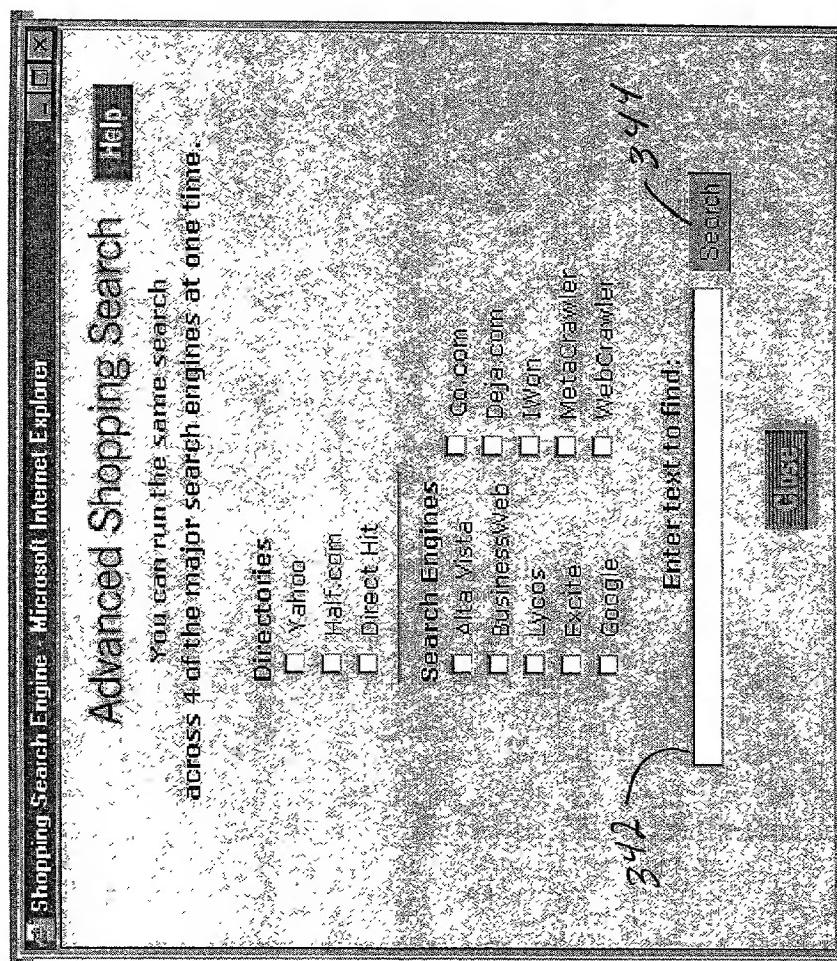


FIG. 7

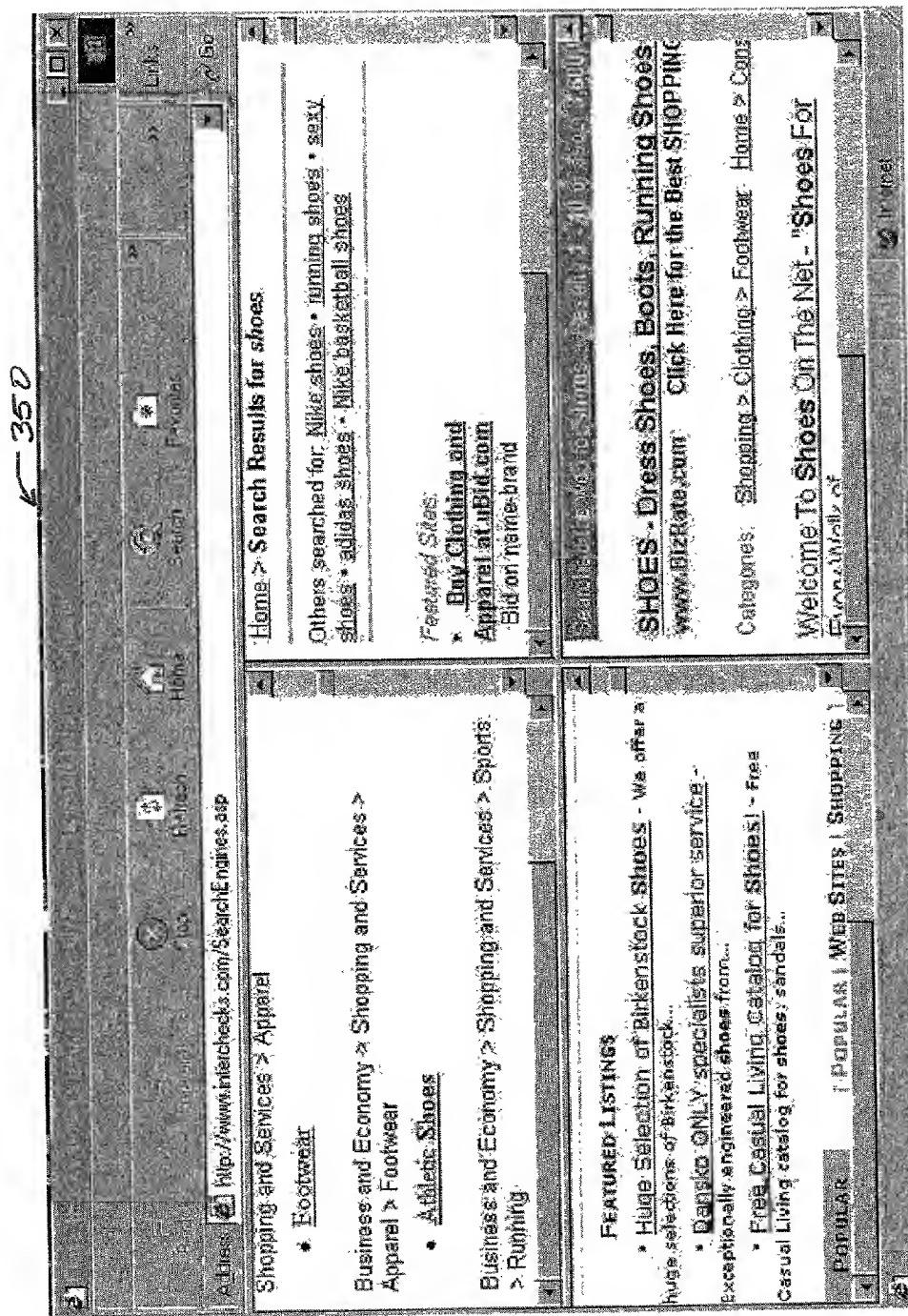


FIG. 8

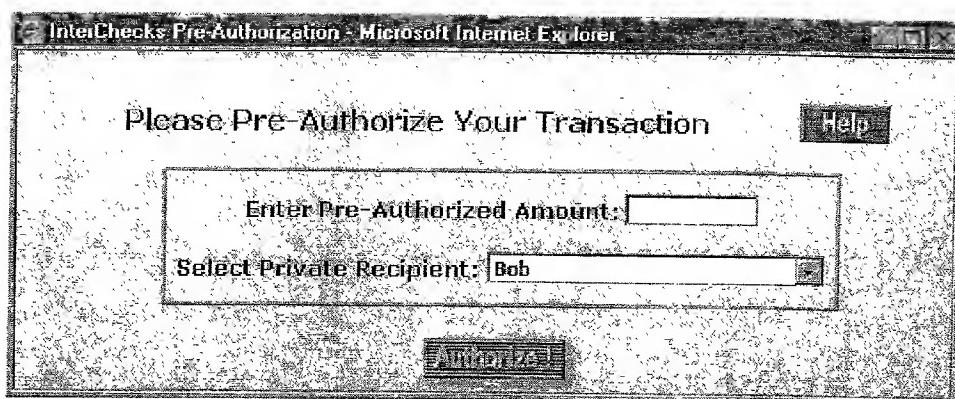


FIG. 9



FIG. 10

Select Items to Return

380

Return Date	Transaction Description	Amount	Reference Number
6/30/99	Enchanted Computer Software Company	\$9.07	1002344
6/30/99	NY Sports Club	\$5.00	1002345
6/29/99	Sharper Image - credit	\$4.10	1002346
6/27/99	Wall Street Journal	\$1.03	1002347
6/25/99	Dell Computer Corp.	\$0.81	1002348
6/25/99	Amazon.com	\$3.56	1002349
6/24/99	Time Magazine	\$9.99	1002350
6/23/99	Victoria's Secret	\$15.25	1002351
6/22/99	Coast	\$25.25	1002352
6/15/99	BMG Music Service	\$27.73	1002353

381

F-15. 11

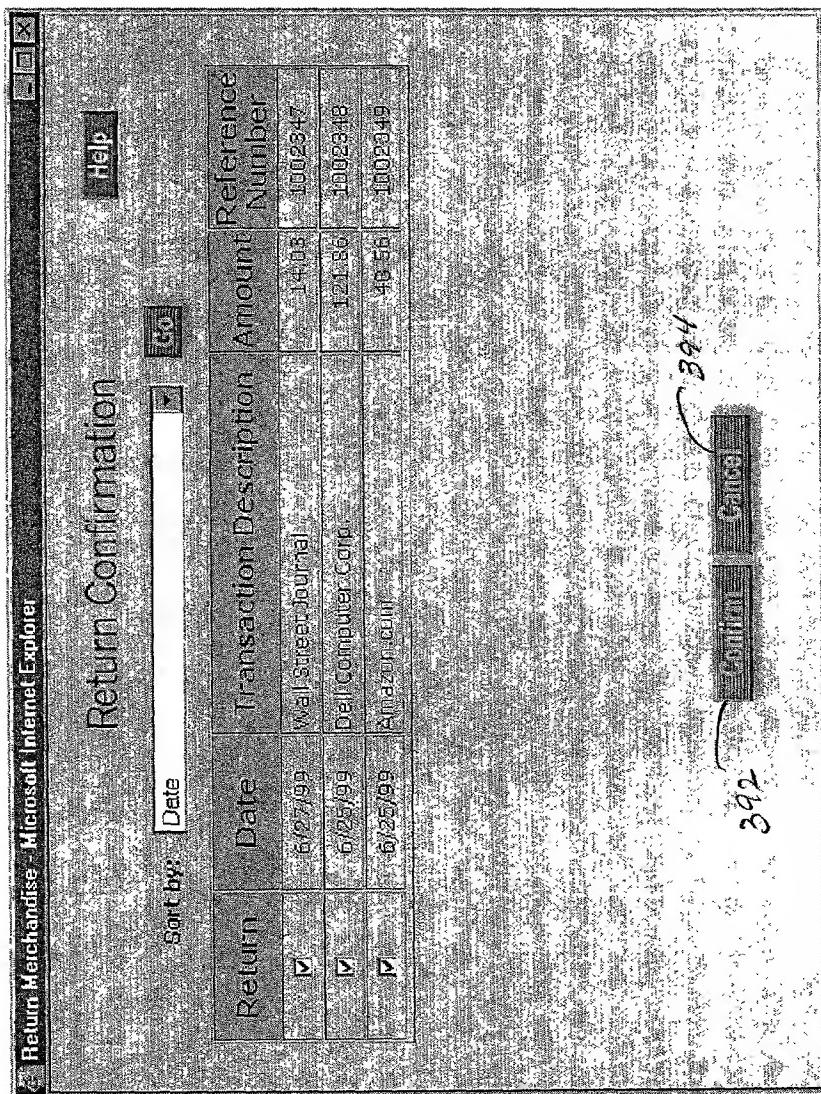


FIG. 12

390

394

392

Qoof

Date	Description	Amount	Reference Number
6/30/99	Eoddhead Computer Software Company	.89	07 1002344
6/30/99	N.Y. Sports Club	15.00	1002345
6/29/99	Sharper Image - credit	14.10	1002346
6/27/99	Wall Street Journal	14.00	1002347
6/25/99	Bell Computer Com.	12.86	1002348
6/25/99	Amazon.com	42.56	1002349
6/24/99	Time Magazine	39.99	1002350
6/23/99	Victoria's Secret	152.60	1002351
6/22/99	Comcast	25.25	1002352
6/15/99	BMG Music Service	25.75	1002353

FIG. 13

420

The screenshot shows a website for "INTER CHECKS". The main header features the word "INTER" in a stylized font where the letters are partially cut out, followed by "CHECKS" in a solid, bold font. Below the header is a navigation menu on the left side with the following items: Home, Demo, About Us, Products, Privacy, Partners, Sign Up, Our Team, and Contact Us. The main content area has a title "Private Shipping Options". Below the title is a message: "Thank you for signing up at InterChecks.com. Using the form below, please create a list of recipient by entering their shipping information." To the right of the message is a form with the following fields and values:

Alias :	FakeName
Recipient Name :	John Public
Address 1 :	1 Someplace St
Address 2 :	
Address 3 :	
City :	Anywhere
State :	NJ
Zip :	07601
Country :	USA
Telephone No :	(201)555-1212

422

FIG. 14

440

442

1 RECIPIENT(S) FOUND						
First Name	Last Name	Address 1	City	State	Zip	Telephone
John Doe	Jane Doe	123 Sample St.	Anytown	N.	01000	(201)555-2345

**ADD ANOTHER RECIPIENT:**

Alias :

Recipient Name :

Address 1 :

Address 2 :

Address 3 :

City :

State :

Zip :

Country :

Telephone No :

**INTER CHECKS**

**Private Shipping Options**

Current recipient list found in the InterChecks database:  
To add more, click [here](#).

Home      Demo      About Us      Products      Privacy  
Partners      Sign In      Our Team      Contact Us

Fig. 15

## METHODS AND SYSTEMS FOR NETWORK BASED ELECTRONIC PURCHASING SYSTEM

### CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. Provisional Application No. 60/207,693, filed May 26, 2000, which is hereby incorporated by reference in its entirety.

### BACKGROUND OF THE INVENTION

[0002] This invention relates generally to computerized information management and processing systems, and more specifically to a system and method that facilitates a secure environment for the electronic purchasing of goods and services via the Internet.

[0003] When a consumer connects to the Internet to purchase goods and services from a virtual merchant web site, the customer is commonly required to complete one or more forms which asks for personal as well as credit card payment information. The information entered into these forms often includes such items as credit card number, type of credit card, expiration date of credit card, consumer name, address, city, state, zip-code, home telephone number, and often business telephone number. Any or all of these items may be considered by the consumer to be confidential in nature. As a result, consumers most often abandon their on-line purchases at the point of checkout, unwilling to pass their personal information through the Internet.

### BRIEF SUMMARY OF THE INVENTION

[0004] In one aspect of the present invention, a method for facilitating purchasing transactions using the Internet is provided which comprises accessing a secure purchasing system account, funding the account, activating the account for purchasing, setting at least one of a transaction amount limit and a time limit for a purchasing session using the account, receiving temporary card numbers and expiration dates for the numbers that are assigned to the account, and using the temporary card numbers to purchase items over the Internet.

[0005] In another aspect, a system to facilitate secure purchasing via the Internet is provided which comprises a central computer further comprising a digital checkbook module, a merchant database module and a temporary card number module. The system further comprises at least one Internet server coupled to said central computer; and at least one of an Internet and an intranet server coupled to said central computer, and further coupled to an acquiring bank processor, the central computer configured to assign temporary debit and credit card numbers using the temporary card number module, to a checkbook of a registered user, the checkbook located within the digital checkbook module, the temporary card numbers being sent by the system to a merchant, via the Internet, to pay for purchases made by the registered user when accessing a merchant website.

[0006] In still another aspect, a method for operating a computer to facilitate private and secure purchasing transactions is provided which comprises prompting a user to enter a user ID and a password, prompting the user to activate a purchasing session, retrieving user account information and generating at least one of a temporary debit card number and a temporary credit card number for use by the user in a purchasing session.

[0007] In yet another aspect of the present invention, a database is provided which comprises data corresponding to merchants who are partnered with a private and secure purchasing system provider, data corresponding to pricing for transactions, data corresponding to credit card and debit card numbers, data corresponding to users, data corresponding to customer histories, data corresponding to account balances and data corresponding to user IDs and passwords.

[0008] In another aspect a computer is provided which is programmed to verify user entered member numbers and user IDs and passwords against an IDs and passwords database in a security module, verify user account balances, assign at least one temporary debit card number and at least one temporary credit card number to a user for a purchasing session, activate a user account for purchasing connect to at least one merchant web site and transmit at least one temporary card number to a merchant as payment for a purchase.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0009] FIG. 1 is a functional block diagram of a private and secure Internet purchasing system.

[0010] FIG. 2A is a functional flow diagram showing the overall method of operation of the system shown in FIG. 1.

[0011] FIG. 2B is a functional flow diagram of the initial user sign-up process.

[0012] FIG. 2C is a functional flow diagram of the user sign-on process.

[0013] FIG. 2D is a functional flow diagram of the user account retrieval process.

[0014] FIG. 2E is a functional flow diagram of the user opening their digital checkbook.

[0015] FIG. 2F is a functional flow diagram of the purchasing process.

[0016] FIG. 3 is an example of a user login page.

[0017] FIG. 4 is an example of a user sign-up page.

[0018] FIG. 5 is an example of a shopping tool bar.

[0019] FIG. 6 is an example of a user help page for the online checkbook.

[0020] FIG. 7 is an example of a shopping search page.

[0021] FIG. 8 is an example of a shopping search results page.

[0022] FIG. 9 is an example of a user pre-authorization page.

[0023] FIG. 10 is an example of an authorization page.

[0024] FIG. 11 is an example of a select items to return page.

[0025] FIG. 12 is an example of a returns confirmation page.

[0026] FIG. 13 is an example of a transaction history page.

[0027] FIG. 14 is an example of a shipping options page.

[0028] FIG. 15 is an example of an add recipient page.

### DETAILED DESCRIPTION OF THE INVENTION

**[0029]** FIG. 1 is one embodiment of an Internet based system 10 according to the present invention. Referring specifically to FIG. 1, system 10 includes a central computer system 12, connected through a firewall 14 to at least one Internet server 16 and at least one intranet server 18. Internet servers 16 and intranet servers 18 are connected to a second firewall 20 which provides communications interface 22 with outside entities. Central computer system 12 receives input signals and transmits output signals over various communications channels and also includes the capability to communicate bi-directionally with other computers as well as the capability to access databases as further described below. Telephone lines and the Internet are used as the primary communications links.

**[0030]** Central computer system 12 includes a plurality of modules and databases for providing private and secure purchasing for registered users via the Internet. In one embodiment, in central computer system 12 includes a merchant database and pricing module 24, a user ID/password security module 26, a digital checkbook module 28, a temporary card numbers module 30, an account cross-referencing module 32 and an omnibus accounting module 34. Further included within central computer system 12 is a database unit 36 which includes a plurality of databases, described below and including, in the embodiment shown, a customer database, an IDs and passwords database, a customer balance database, a customer history database, a card number database, a merchant database, and a pricing database. In other embodiments, database 36 is located external to central computer system 12.

**[0031]** As stated above, central computer system 12 is configured to provide private and secure purchasing for registered users. A person using a user computer 40 connects to the Internet 42 through any of a variety of known methods and connects to a web site hosted on Internet server 16 and proceeds to register to become a registered user and to set up user accounts and balances. Once a registered user, the person is able to access their account to make purchases, for example, from a merchant web site hosted on merchant computer 44, via Internet 42.

**[0032]** A merchant is either partnered with the private and secure purchasing provider, or they or not. For merchants partnered with the private and secure purchasing provider, transactions for Internet purchases are treated as debit card transactions by an acquiring bank card processor 46 which is connected through a network, intranet or Internet, to merchant computer 44 and central computer system 12. For merchants not partnered with the private and secure purchasing provider, transactions for Internet purchases are treated as credit card transactions. For such merchants, merchant computer 44 is configured to relay information regarding the transaction to a merchant bank card processor 48, which relays the transaction information, via an authorization network 50 to acquiring bank card processor 46 which is connected to central computer 12 through a secure network. After verification of sufficient account funding, acquiring bank card processor 46 transmits an approval or denial over authorization network 50 and funds are transferred from acquiring bank card processor 46 to merchant bank card processor 48 via an interchange network 52. By

partnering with the private and secure purchasing provider, merchants and financial institutions, for example, acquiring bank card processor 46, are able to access and provide per-transaction debit card pricing for the service, rather than credit card pricing.

**[0033]** In one embodiment, member merchants have a button on their website which allows processing of purchases using a customized form. The form is populated by accessing the identification output file placed on the user computer 40 by central computer system 12 and filling the fields with the necessary purchasing information including the users temporary debit card number. The process allows the merchant to access special per-transaction debit card pricing rather than credit card pricing as described above.

**[0034]** FIG. 2A is a flowchart 70 which diagrams procedures executed by and implemented in central computer system 12 of system 10 (shown in FIG. 1). After a user initiates 72 Internet access, they choose to connect 74 to the private and secure purchases provider web site. The user may choose to exit 76 at this time. Alternatively, if the user chooses to continue, they are queried 78 if they are accessing central computer system 12 for the first time. If the user is accessing for the first time, a sign up process is initiated 80 which is described in further detail in FIG. 2B below. If not accessing for the first time, the user establishes 82 a secure connection to the private and secure purchases provider web site, and enters 84 their digital checkbook, which is described in further detail in FIG. 2C below.

**[0035]** The user then chooses whether to request and obtain 86 account information or to display 88 their checkbook with account information. After account information is requested and obtained 86, the checkbook with account information is displayed 88. After display 88 of checkbook with account information, the user opens the checkbook and is issued 90 secure temporary card numbers, both debit and credit, for Internet purchases, which are described in further detail in FIG. 2E below. After temporary card numbers are issued 90, the user chooses 92 whether or not to make purchases via the Internet. The user exits 94 if no purchasing is to be done at this time. Internet purchasing is further described in FIG. 2F below.

**[0036]** FIG. 2B is a flowchart 100 which shows steps followed when a user initiates 80 (also shown in FIG. 2A) a sign up process. First, the user selects 102 a user ID and a password, and then selects 104 whether an application will be completed online or off line. If off line, the user downloads 106 a paper application and mails the completed application to a central processing center (not shown). If the application is to be completed online, the user establishes 108 a secure network connection and completes an online application. In completing the application, online or off line, the user selects 110 an account funding option. Two funding options are a selection 112 of a direct debit from a personal checking account or selection 112 of a charge to a credit card account. Upon such a selection 112, the user sends 114 a written authorization and a copy of a voided check or a credit card number to the private and secure purchasing system provider. After processing is completed, the user is issued 116 a secure purchasing provider account number and member number. If the user chooses to fund 118 their account at this time, they fund 120 their private and secure account, otherwise the user exits 122 the web site.

[0037] The user may select 124 a private and secure purchasing provider online money fund as their preferred method of funding their account for Internet purchases. To fund an account for Internet purchases in this manner, the user opens 126 a private and secure purchasing provider online money fund account. After opening 126 the account, the user is issued 128 a private and secure purchasing provider online money fund account number. To fund 130 the online money fund account, the user provides the private and secure purchasing provider funds via one of check, money order, ACH, wire transfer and credit card, for example. Of course, other funding vehicles may be used to fund the account. After funding the online money fund account, the user exits 132.

[0038] A further method for funding a user account is by selecting 134 to have an account at a financial institution that has partnered with the private and secure purchasing provider to provide purchasing accounts, for example, acquiring bank card processor 46 (shown in FIG. 1). When the account is opened at the financial institution, the user is issued 136 a private and secure purchasing provider member number.

[0039] FIG. 2C is a flowchart 140 which further illustrates of a process where a user signs on and activates their digital checkbook. A user signs on by entering 142 their private and secure purchasing provider member number. If the entered membership number is valid 144, the user is instructed to enter 146 their user ID and password. If the user ID is valid 148, access is granted 150. User IDs and membership numbers are provided in a database 152, which is part of database 36 (shown in FIG. 1). If an invalid member number is entered, and the number of attempts to enter the digital checkbook is below 154 a threshold, the user may retry 156 entering the digital checkbook, otherwise central computer system 12 (shown in FIG. 1), disconnects the user, forcing an exit 158. If a membership number entered 142 is valid 144, but the user ID entered 146 is not valid 148, an E-mail notification is sent 160 to the account holder of record, and central computer system 12 exits 162.

[0040] FIG. 2D is a flowchart 170 which illustrates a process for account information retrieval. First, after entering 84 (shown in FIG. 2A) the digital checkbook, user account information is retrieved 172 in real time and copied to omnibus accounting module 34 (also shown in FIG. 1). Depending on the funding option previously selected, money fund account information and short-term deposit account information 174 and/or partner financial institution account information 176 are copied to accounting module 34. Omnibus accounting module 34 then causes central computer system 12 to display 178 user account information.

[0041] FIG. 2E is a flowchart 180 illustrating opening and activation of the digital checkbook for making Internet purchases. A user which has successfully entered the private and secure purchasing provider system by entering a valid member number and user ID/password, opens 182 their digital checkbook, which is a register of the member's account, to make Internet purchases. The user then sets 184 at least one of specific transaction limits or time limits on the purchasing session. The digital checkbook module 28 (shown in FIG. 1) is then activated 186. Notification of the activation is sent to account cross referencing module 32

(also shown in FIG. 1). Further, a customer account balance is sent to account cross referencing module 32 from a customer account database 188 within database 36 (shown in FIG. 1). Also sent to account cross referencing module 32 is a temporary card number used for making the purchases. The temporary account number is generated based on information within card number database 190 and customer history database 192, both within database 36. Temporary card number module 30 (also shown in FIG. 1) determines 194 a least active card number within database 190 and determines 196 if the number is currently active. If active, module 30 determines another card number that has been inactive the longest amount of time. The process is repeated until a card number that is currently inactive is identified. Once a inactive card number is determined 196, module 30 determines 198 if the particular card number has ever been assigned to that user in a previous purchasing session. If so, the process above is repeated until an inactive card number that has never been assigned to the particular user is identified. The temporary card number is then sent to account cross referencing module 32, which activates 200 the temporary card numbers by sending instructions to a card processor, for example, acquiring bank card processor 46 (shown in FIG. 1) to activate the card numbers.

[0042] The digital checkbook is then activated 202 with a temporary debit card number, a temporary credit card number, and an expiration date all of which are linked to the user account. A scheduler is then set 204 to deactivate the card numbers, debit and credit, once one of a pre-defined time limit has expired or a transaction amount limit has been exceeded. User account information, for example, account balance and card numbers, is placed 206 on user computer 40 (shown in FIG. 1) in the form of an identification output file, from central computer system 12 (shown in FIG. 1).

[0043] FIG. 2F is a flowchart 220 illustrating using 222 the temporary card numbers and expiration dates of the card numbers to make Internet purchases. Referring specifically to flowchart 220, the user connects 224 to merchant computer 44 (shown in FIG. 1) to shop and make selections for purchase via the Internet. After making their selections, the user selects 226 a payment method, depending on whether the merchant is partnered with the private and secure purchasing provider. If so partnered, the virtual store displays 228 a logo of the private and secure purchasing provider. The user then uses 230 a member merchant's virtual shopping cart application to select goods and services. When ready to "check out" the user selects 232 the logo of the private and secure purchasing provider to view their online digital checkbook. Information from the identification output file is then uploaded 234 from user computer 40 (shown in FIG. 1) to merchant computer 44. A digital checkbook pop-up window is displayed 236 which includes a user purchase amount, a check register, shipping information that is on file, a temporary debit card and pin number, and expiration date. The user then confirms 238 the purchase amount and shipping information and submits a payment transaction. The user transaction is acquired 240 by a private and secure purchasing provider processor and is treated as a debit card payment authorization.

[0044] If the merchant is not partnered with the private and secure purchasing provider, shopping at the non-member merchant virtual store 242 is as follows. The user then uses 244 a member merchant's virtual shopping cart appli-

cation to select goods and services. When ready to "check out" the user enters 246 their private and secure purchasing provider temporary credit card number and expiration date into the credit card payment option on the merchant's payment form and submits the payments transaction. The non-member merchant treats the temporary credit card number as a normal credit card transaction and passes 248 the payment directly to their merchant bank for authorization.

[0045] The merchant bank passes 250 the payment transaction through authorization and interchange networks onto the private and secure purchasing provider based on BIN numbers associated with the temporary credit card. The user transaction is acquired 252 by a private and secure purchasing provider processor and is treated as a credit card payment authorization.

[0046] Operation of such a private and secure purchasing system as described above is further described using exemplary displays which are displayed by central computer system 12 at user computer 40 and described below.

[0047] FIG. 3 is an embodiment of a user login screen 300. Screen 300 is displayed on user computer 40 (shown in FIG. 1) when a person accesses central computer system 12 via Internet 42 and through Internet server 16. Persons who are registered users may simply enter and submit their pre-selected username and password to begin private and secure Internet shopping. If not a registered user, the person who has accessed login screen 300, may select a sign up button in selection bar 302 to register, as described below.

[0048] FIG. 4 is an exemplary embodiment of a user registration page 310, which is displayed upon selection of the sign up button on page 300 (shown in FIG. 3). Page 310 includes data entry fields 312 where a user wishing to register enters such items as a selected username and password, personal identification data, email addresses and account data, to which their future secure purchases will actually be charged against, for example, a bank checking or savings account or a personal credit card. In one embodiment, a registered user will pre-fund a deposit account for their future purchases. Selecting an apply button 314, uploads the user entered information to central computer system 12 for new account processing.

[0049] FIG. 5 is an exemplary embodiment of a start page 320, which is displayed to a user upon a successful login. Page 320 provides the registered user with choices such as activating their digital checkbook, performing a search, viewing a transaction history, setting privacy options, and performing returns, all described below. In one embodiment of start page 320, the user choices are configured as selectable icons 322.

[0050] FIG. 6 is a help page 330 which displayed upon selection of a help option within start page 320 (shown in FIG. 5). Page 330, in the embodiment shown, includes descriptions for logging in and logging off, activating the digital checkbook, viewing transaction histories, privacy options, the shopping search and returns. In addition, the descriptions are headed by selectable icons 322 (also shown in FIG. 5) which, when selected, activate the particular function, for example, a transaction history.

[0051] FIG. 7 is an exemplary embodiment of a shopping search page 340. Search page 340 allows a user to search for their desired purchase using one or more of the popular

search engines and directories available on the Internet. To perform the search the user selects which of the search engines and directories they wish to use, then a purchase item, for example, "shoes" is entered into a text box 342, and a search is initiated by selection of a search button 344 and displayed on a search results page 350, as shown in FIG. 8, which is displayed upon completion of the search as entered into shopping search page 340. It is to be noted that selection of search button 344 initiates searches on all of the selected search engines and directories, and that the item to be searched for, "shoes", for example, is entered by the user only once for search results for all of the search engines and directories.

[0052] Referring specifically to FIG. 8, search results for a plurality of the well-known search engines and directories are displayed on a multiple frame, search results page 350. Search results within each frame are displayed and hyperlinks within the frames are selectable. Selection of a hyperlink within a frame causes a browser window to open and display the selected hyperlink.

[0053] FIG. 9 is an exemplary embodiment of a pre-authorization transaction page 360 which is displayed upon selection of an item for purchase from shopping results page (not shown). To pre-authorize a transaction, the registered user enters an amount to be authorized, and further enters a recipient of the authorized amount. The transaction is not authorized until the user selects an authorize button 362. In addition, a registered user is able to select a recipient which is another person or which may be an alias for the registered user as described in FIG. 14 below.

[0054] FIG. 10 is an exemplary embodiment of an authorization page 370 for the transaction. The transaction, and therefore the purchase, is not completed until the user checks the information within authorization page 370 for correctness and completeness. Selection of a done button 372, authorizes the purchase, and further causes the merchant to be notified of the purchase, in the form of a transmission to merchant computer 44 (shown in FIG. 1). Notification of the purchase includes presenting the merchant with payment for the items purchased, that is, sending temporarily valid card number 374 to merchant computer 44, which causes card number 374 to be processed through card processors 46 and 48 as described above. Selection of done button 372 further causes the user's deposit account to be reduced by the purchase amount. If upon review of page 370, the user wishes to change a previously selected recipient, a change recipient button 376, causes, upon selection, an availability to the user for a change of recipient. Entry of recipient information for storage in central computer system 12 (shown in FIG. 1) is described in FIGS. 14 and 15 below.

[0055] FIG. 11 is an exemplary embodiment of a returns page 380. Upon selection of the returns option on page 320 (shown in FIG. 5), central computer system 12 (shown in FIG. 1) causes returns page 380 to be displayed. Page 380 includes dates, descriptions, amounts, and reference numbers for recent transactions. Transactions are further sortable by any one of date, reference number, amount and description of transaction. A user is able to select any one or a number of transactions for return by selection of a return checkbox for each transaction. Selection of a return button 382 causes a return confirmation page to be displayed.

[0056] FIG. 12 is an exemplary embodiment of a return confirmation page 390. Page 390 displays all of the items

selected for return, in the same format, as page 380 (shown in FIG. 11). Selection of a confirm button 392 causes central computer system 12 to notify the merchants of the return and further enters a credit to the user's deposit account. A cancel button 394 causes a cancellation of the contemplated returns. As described for page 380, page 390 allows a user to sort items marked for return by any of date, description, amount and reference number.

[0057] FIG. 13 is an exemplary embodiment of a transaction history page 400. Upon selection of the transactions history option on page 320 (shown in FIG. 5), central computer system 12 (shown in FIG. 1) causes returns page 380 to be displayed. Page 400 includes dates, descriptions, amounts, and reference numbers for transactions. Transactions displayed on page 400 are further sortable by any one of date, reference number, amount and description of transaction, as selected by the user. A length of the transaction history displayed is further selectable by the user. As shown on page 400, the history displayed is the last 10 transactions. Smaller or larger numbers of transactions can be selected by the user.

[0058] FIG. 14 is an exemplary embodiment of a private shipping options page 420. Shipping options page 420 allows a registered user to enter shipping information, for example, name, address and telephone number for storage in database 36 of central computer system 12 (both shown in FIG. 1) for recipients of a registered user's online purchases. In addition, shipping options page 420 allows a user to enter an alias for each recipient. The alias is supplied to merchants when purchasing items from a merchant's virtual store. In addition to allowing a user of the private and secure purchasing system anonymity when shopping, using aliases allows a user to purchase gifts for others, whose aliases and shipping information the user has previously stored within database 36, without providing the other's names.

[0059] Aliases are stored within database 36 after entry of the shipping information and selection of an Add button 422. Referring to FIGS. 9 and 10, a user is able to select from their listing of stored aliases when pre-authorizing a transaction, by selecting a private recipient, or after authorization using change recipient button 376. Selected aliases are part of the identification output file (described above) which is transferred from central computer system 12 to user computer 40 and sent to merchant computer 44 (all shown in FIG. 1) when the user makes a purchase from the merchant.

[0060] FIG. 15 is an exemplary embodiment of an add recipient page 440, where the registered user is able to view a current recipient list 442, including aliases, and can add additional recipients in the same manner as recipients are added on shipping options page 420 (shown in FIG. 14).

[0061] While the invention has been described in terms of various specific embodiments, those skilled in the art will recognize that the invention can be practiced with modification within the spirit and scope of the claims.

What is claimed is:

1. A method for facilitating purchasing transactions using the Internet, said method comprising the steps of:

- accessing a secure purchasing system account;
- funding the account;
- activating the account for purchasing;

setting at least one of a transaction amount limit and a time limit for a purchasing session using the account; receiving temporary card numbers and expiration dates for the numbers that are assigned to the account; and using the temporary card numbers to purchase items over the Internet.

2. A method according to claim 1 wherein said step of accessing a secure purchasing system account further comprises the step of:

- establishing a secure connection to a private and secure purchases provider web site; and
- receiving an account number and a member number from the private and secure purchasing system account provider.

3. A method according to claim 1 wherein said step of funding the account further comprises the step of selecting a funding option.

4. A method according to claim 3 wherein said step of selecting a funding option comprises the step of selecting at least one of a direct debit from a checking account, a credit card account, a private and secure purchasing provider online money fund, and an account at a financial institution offering the private and secure purchasing product.

5. A method according to claim 4 wherein, for a direct debit from a checking account, said step of funding the account comprises the step of sending a written authorization and a copy of a voided check to the private and secure purchasing provider.

6. A method according to claim 4 wherein, for a credit card account, said step of funding the account comprises the step of sending the credit card number to the private and secure purchasing provider.

7. A method according to claim 4 wherein, for a private and secure purchasing provider online money fund, said step of funding the account comprises the step of sending at least one of a check, a money order, an ACH, a wire transfer, and a credit card number to fund the account.

8. A method according to claim 1 wherein said step of activating the account for purchasing further comprises the steps of:

- entering a valid member number;
- entering a valid user ID and password;
- selecting a recipient for purchases; and
- receiving user account information.

9. A method according to claim 8 wherein said step of selecting a recipient for purchases comprises the step of selecting an alias as the recipient, the alias including shipping information to be supplied to a merchant, the alias not providing the identity of the recipient to the merchant.

10. A method according to claim 8 wherein said step of receiving user account information further comprises the step of receiving an account balance.

11. A method according to claim 1 wherein said step of receiving temporary card numbers further comprises the steps of:

- receiving a temporary debit card number for purchases from merchants who are partnered with the private and secure purchasing provider; and

receiving a temporary credit card number for purchases from merchants who are not partnered with the private and secure purchasing provider.

**12.** A method according to claim 11 wherein said step of using the temporary card numbers to make Internet purchases further comprises the steps of:

- connecting to a merchant web site;
- selecting at least one of goods and services for purchase;
- selecting a private and secure purchasing provider logo from a partnered merchant web site; and
- confirming at least one of a purchase amount and shipping information; and
- submitting a payment transaction as a debit card transaction.

**13.** A method according to claim 11 wherein said step of using the temporary card numbers to make Internet purchases further comprises the steps of:

- connecting to a merchant web site;
- selecting at least one of goods and services for purchase;
- entering the temporary credit card number and expiration date into a credit card payment option at the merchant web site;
- confirming at least one of a purchase amount and recipient information; and
- submitting the payment as a credit card transaction.

**14.** A method according to claim 13 wherein said step of confirming recipient information comprises the steps of:

- electing to change a previously selected recipient; and
- selecting a new recipient from a list of aliases, shipping information for each alias being contained in an output information file.

**15.** A system to facilitate secure purchasing via the Internet comprising:

- a central computer further comprising:
- a digital checkbook module;
- a merchant database module; and
- a temporary card number module;
- at least one Internet server coupled to said central computer; and
- at least one of an Internet and an intranet server coupled to said central computer, and further coupled to an acquiring bank processor, said central computer configured to assign temporary debit and credit card numbers using said temporary card number module, to a checkbook of a registered user, the checkbook located within said digital checkbook module, the temporary card numbers being sent by said system to a merchant, via the Internet, to pay for purchases made by the registered user when accessing a merchant website.

**16.** A system according to claim 15 wherein said temporary card number module is configured to:

- access a card number database to select at least one inactive credit card number and at least one debit card number; and

access a customer history database to determine which card numbers to allocate for a session.

**17.** A system according to claim 16 wherein to access a customer history database to determine which card numbers to allocate said temporary card number module configures said central computer to:

- select a least actively used credit card number and debit card number;
- determine if the selected card numbers are currently active for any other users; and
- determine if the selected card numbers have been previously assigned to the user.

**18.** A system according to claim 17 wherein said central computer is configured to deactivate debit and credit card numbers as soon as a time limit on a purchasing session has expired.

**19.** A system according to claim 15 wherein said central computer further comprises a merchant database and pricing module configured to identify merchants which are partnered with the private and secure purchasing provider.

**20.** A system according to claim 19 wherein said central computer system is configured to:

- charge debit card rates for transactions to merchants who are partnered with the private and secure purchasing provider; and

charge credit card rates for transactions to merchants who are not partnered with the private and secure purchasing provider.

**21.** A system according to claim 15 wherein said central computer further comprises a user identification module configured with at least one of member numbers, user IDs and passwords, and recipient information for registered users.

**22.** A system according to claim 21 wherein said central computer is configured to assign member numbers to users who register for an account and provide funding for an account.

**23.** A system according to claim 21 wherein said recipient information comprises:

- at least one shipping destination for purchases; and
- an alias attached to each shipping destination.

**24.** A system according to claim 15 wherein said central computer further comprises an account cross-referencing module configured to:

- retrieve user account information and account balances from a customer database;

link the temporary card numbers received from said temporary card number module to user accounts; and

activate the card numbers.

**25.** A system according to claim 24 wherein to activate the card numbers, said central computer system is configured to send instructions to activate the card numbers to the acquiring bank processor.

**26.** A system according to claim 24 wherein said central computer system is configured to transmit an identification output file to a user computer, the output file comprising user account information, card number information, and recipient information.

**27.** A system according to claim 15 wherein said central computer further comprises an omnibus accounting module configured to access a customer database to retrieve user account balances and transaction histories.

**28.** A system according to claim 15 wherein said central computer is configured to allow a user who is registering with the private and secure purchasing provider to select an account funding option.

**29.** A system according to claim 28 wherein the account funding options comprise a direct debit from a personal checking account, a charge to a credit card account, a private and secure purchasing provider online money fund, and an account at a financial institution who is partnered with the private and secure purchasing provider.

**30.** A system according to claim 15 wherein said central computer is configured to facilitate returns of Internet purchases.

**31.** A system according to claim 15 wherein said central computer is configured with a search page, which is configured to search one or more of selected Internet search engines and Internet directories to search for goods and services, based upon a single user entered search item.

**32.** A system according to claim 31 wherein said central computer is configured to display search results for all selected search engines and Internet directories in a single page, a frame being displayed within the page with search results for each of the selected search engines and Internet directories.

**33.** A system according to claim 32 whereupon selection of a hyperlink displayed within a frame, said central computer is configured to open a web browser and display a web page which corresponds to the selected hyperlink.

**34.** A system according to claim 15 wherein said central computer is configured with transaction histories for each user.

**35.** A system according to claim 15 wherein said central computer is configured with a help screen, said help screen including headings for at least one of logging in, logging off, activating checkbox, transaction history, privacy options, shopping search and returns, the headings configured as hyperlinks out of said help screen.

**36.** A method for operating a computer to facilitate private and secure purchasing transactions, said method comprising the steps of:

- prompting a user to enter a user ID and a password;
- prompting the user to activate a purchasing session;
- retrieving user account information; and
- generating at least one of a temporary debit card number and a temporary credit card number for use by the user in a purchasing session.

**37.** A method according to claim 36 further comprising the step of transmitting instructions to an acquiring bank processor to activate the card numbers.

**38.** A method according to claim 36 further comprising the step of prompting the user to select a recipient.

**39.** A method according to claim 38 further comprising the step of transmitting an identification output file to a user computer, the output file comprising at least one of user account information, card number information, and recipient information.

**40.** A method according to claim 39 wherein the recipient information includes an alias, the alias used to identify the recipient.

**41.** A method according to claim 36 further comprising the steps of:

- transmitting at least one of a temporary debit card number and a temporary credit card number to a computer of an online merchant to pay for an online purchase;

- transmitting recipient information to the merchant computer for shipping; and

- transmitting a confirmation to the merchant computer.

**42.** A method according to claim 41 further comprising the steps of:

- acquiring a payment authorization;

- processing the authorization as a debit card transaction if the merchant is partnered with the private and secure purchasing provider; and

- processing the authorization as a credit card transaction if the merchant is not partnered with the private and secure purchasing provider.

**43.** A database comprising:

- data corresponding to merchants who are partnered with a private and secure purchasing system provider;

- data corresponding to pricing for transactions;

- data corresponding to credit card and debit card numbers;

- data corresponding to users;

- data corresponding to customer histories;

- data corresponding to account balances; and

- data corresponding to user IDs and passwords.

**44.** A database according to claim 43 where said data corresponding to customer histories comprises data corresponding to card numbers previously assigned to a user for a purchasing session.

**45.** A database according to claim 43 further comprising data corresponding to recipients for a user.

**46.** A database according to claim 45 wherein said data corresponding to recipients further comprises an alias and shipping information for each recipient.

**47.** A computer programmed to:

- verify user entered member numbers and user IDs and passwords against an IDs and passwords database in a security module;

- verify user account balances;

- assign at least one temporary debit card number and at least one temporary credit card number to a user for a purchasing session;

- activate a user account for purchasing;

- connect to at least one merchant web site; and

- transmit at least one temporary card number to a merchant as payment for a purchase.

**48.** A computer according to claim 47, wherein to activate a user account for purchasing, said computer is programmed to transmit instructions to an acquiring bank processor to activate the card numbers.

**49.** A computer according to claim 47 further programmed to transmit an identification output file to a user computer, the output file comprising user account information, card number information, and recipient information.

**50.** A computer according to claim 49 further programmed to allow a user to select a recipient from a list of recipients within the identification output file.

**51.** A computer according to claim 49 wherein the recipient information includes an alias and a shipping destination for each recipient.

**52.** A computer according to claim 47 wherein to assign temporary card numbers, said computer is programmed to:

access a database of inactive card numbers;

select a least actively used credit card number and debit card number;

determine if the selected card numbers are currently active for any other users; and

determine if the selected numbers have been previously assigned to the user.

**53.** A computer according to claim 47 further programmed to receive approvals and rejections from at least one of acquiring bank processors and merchant bank card processors.

**54.** A computer according to claim 47 further programmed to display a search page, which is configured to allow a user to select one or more of Internet search engines and Internet directories to search for goods and services, based upon a single user entered search item into the search page.

**55.** A computer according to claim 54 further programmed to display search results for all selected search engines and Internet directories in a single search results page, a frame for each of the selected search engines and Internet directories being displayed within the page, the frame including the search results.

**56.** A computer according to claim 55 programmed to open a web browser and display a web page which corresponds to a selected hyperlink, upon selection of a hyperlink displayed within a frame.

\* \* \* \* \*



US006064979A

# United States Patent [19]

Perkowski

[11] Patent Number: **6,064,979**  
[45] Date of Patent: \*May 16, 2000

[54] **METHOD OF AND SYSTEM FOR FINDING AND SERVING CONSUMER PRODUCT RELATED INFORMATION OVER THE INTERNET USING MANUFACTURER IDENTIFICATION NUMBERS**

[75] Inventor: Thomas J. Perkowski, Darien, Conn.

[73] Assignee: IPE, Inc., Darien, Conn.

[\*] Notice: This patent is subject to a terminal disclaimer.

[21] Appl. No.: **08/752,136**

[22] Filed: **Nov. 19, 1996**

## Related U.S. Application Data

[63] Continuation-in-part of application No. 08/736,798, Oct. 25, 1996, Pat. No. 5,918,214.

[51] Int. Cl.<sup>7</sup> ..... **G06F 17/60**

[52] U.S. Cl. ..... **705/26; 235/375; 378/93.12; 709/219; 705/27**

[58] **Field of Search** ..... 705/1, 14, 16, 705/21, 22, 24, 26, 27; 707/1, 2, 3, 4, 10, 101, 104, 501, 513; 395/200.3, 200.31, 200.33, 200.47, 200.48, 200.49; 235/375, 376, 462; 329/93.12; 709/219

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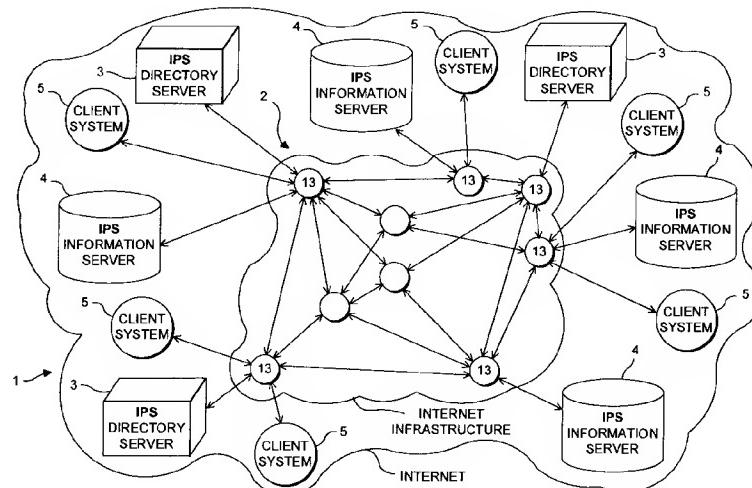
Primary Examiner—Stephens R. Tkacs

Attorney, Agent, or Firm—Thomas J. Perkowski, Esq., P.C.

## [57] ABSTRACT

A method of and system for finding and serving consumer product-related information on the Internet comprising a database serving subsystem which stores: a plurality of manufacturer identification numbers (MINs) assigned to a plurality of manufacturers of consumer products; a plurality of home-page specifying URLs symbolically linked to the plurality of MINs; a plurality of universal product numbers (UPN) assigned to a plurality of consumer products made by the plurality of manufacturers; and a plurality of product-information specifying URLs symbolically linked to the plurality of UPNs. During operation, a client subsystem transmits to the database serving subsystem, a request for information which includes the UPN assigned to the consumer product on which product-related information is being sought. The database serving subsystem automatically compares the UPN against the stored plurality of MINs, and automatically returns to the client subsystem, one or more of URLs symbolically linked to the UPN, if URLs have been symbolically linked to the UPN within the database serving subsystem. However, if no URLs have been symbolically linked to the UPN, then the database serving subsystem automatically returns the home-page specifying URL symbolically linked to the MIN contained within the UPN in the request. By virtue of this novel MIN-based search mechanism embodied within the database serving subsystem, client subsystems are automatically provided with the home-page of the manufacturer's World Wide Web (WWW) site in situations where product-information specifying URLs have not yet been symbolically linked with the UPN on any one of the manufacturer's products.

**27 Claims, 12 Drawing Sheets**



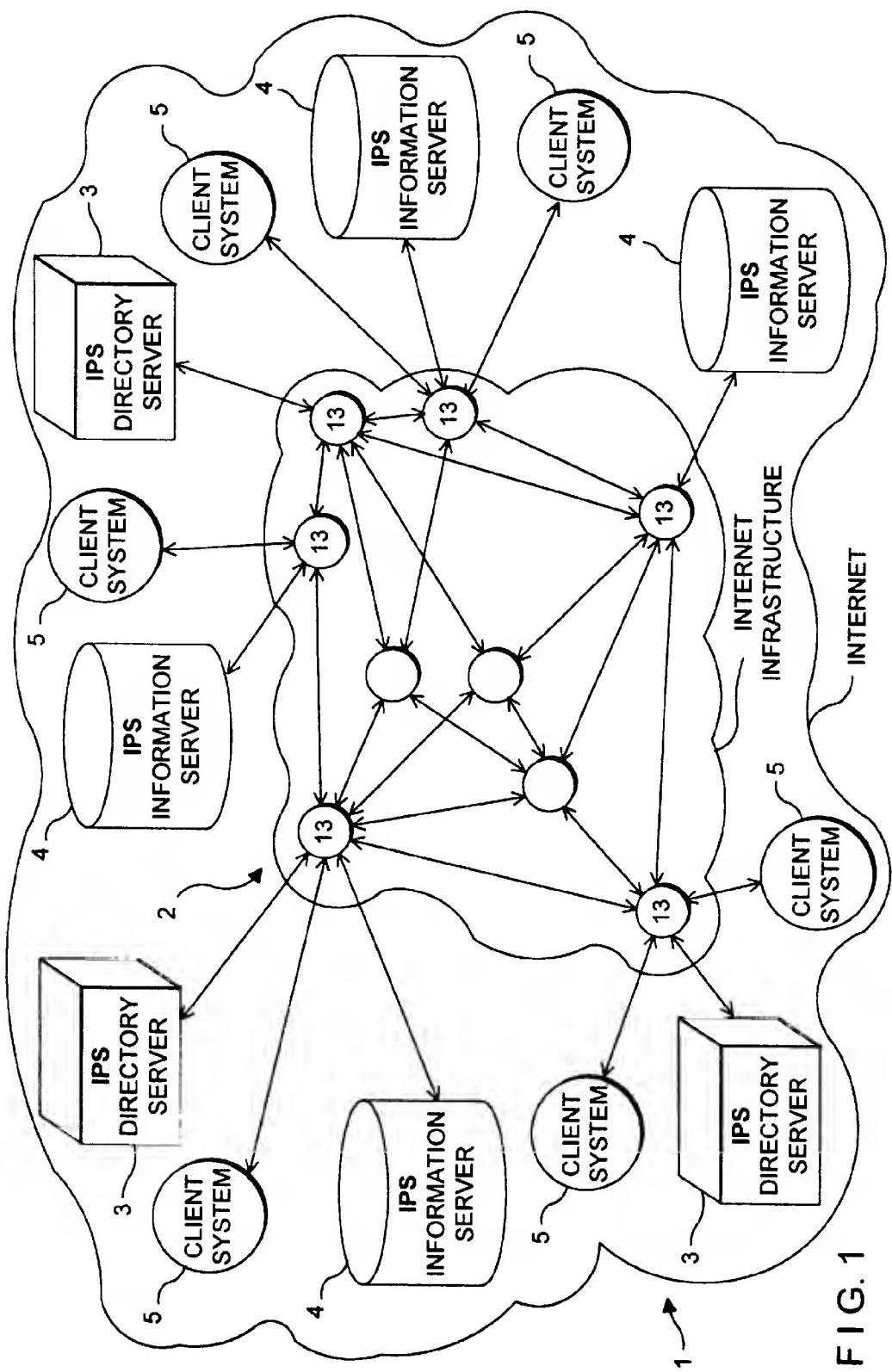


FIG. 1

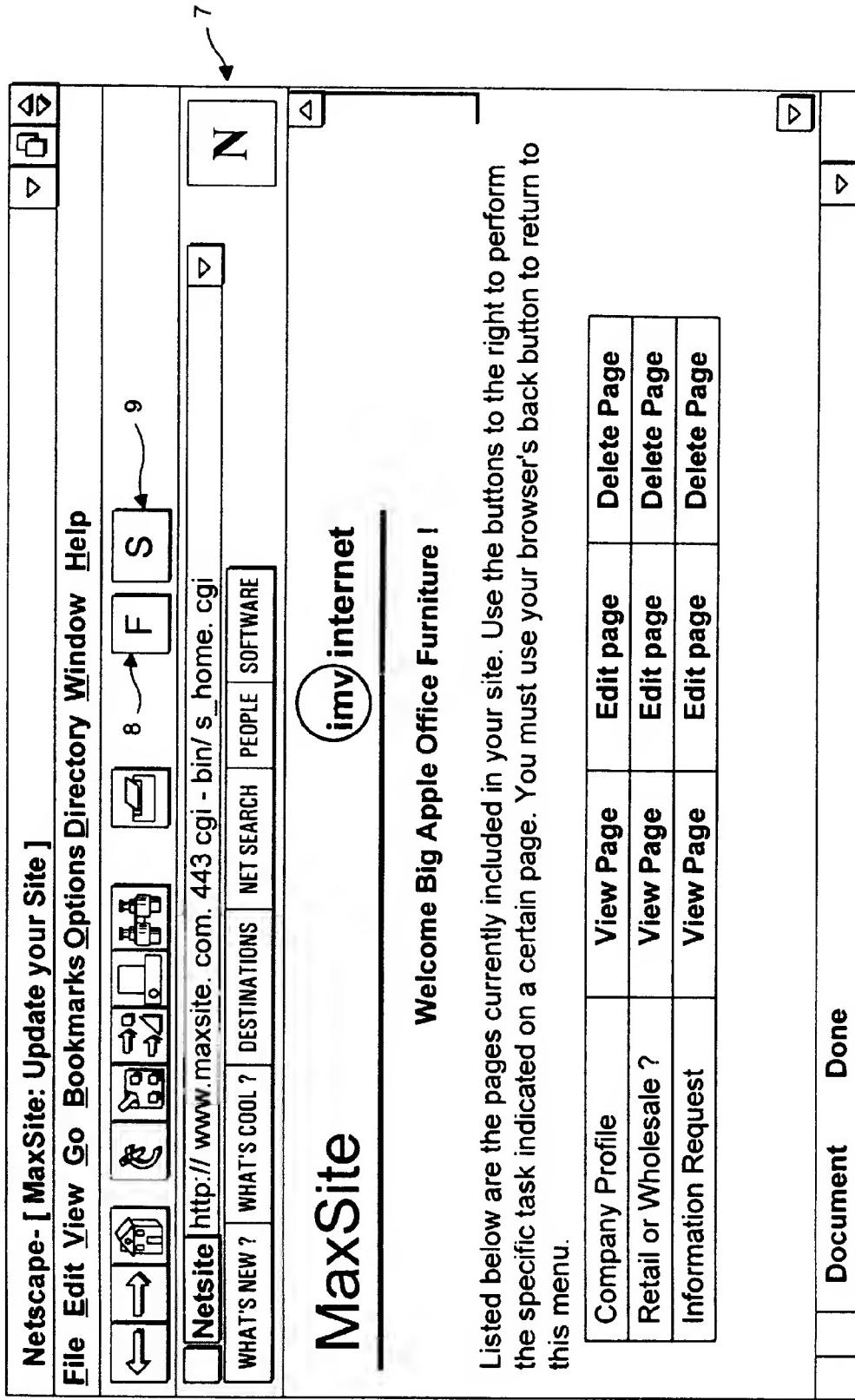


FIG. 1A

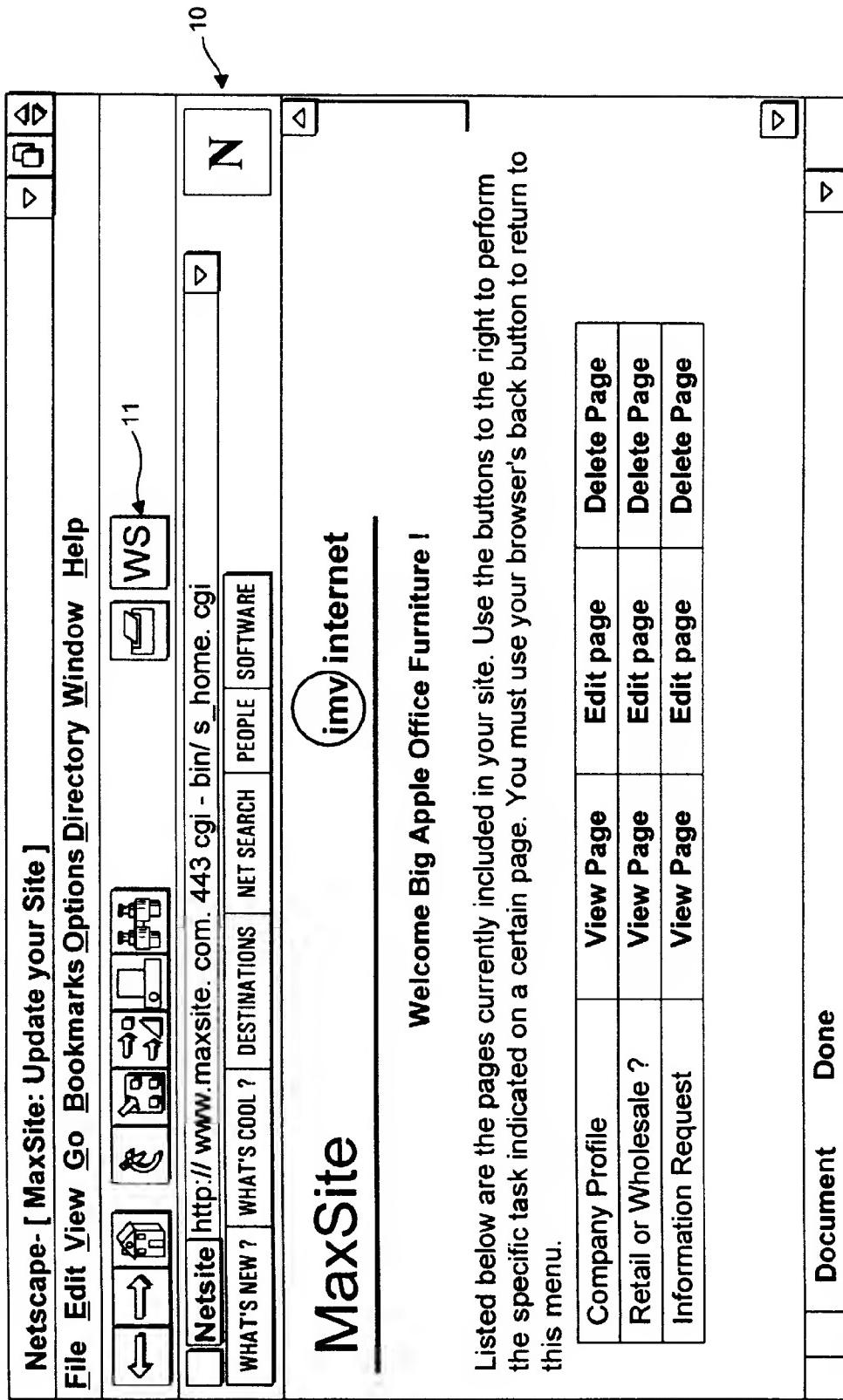


FIG. 1B

IP / SN	REGISTRANTS NAME	PRODUCT DESCRIPTION	UNIFORM RESOURCE LOCATOR (URL)	TRADE/ SERVICE MARKS	e-mail Address	Status
7/18908/17674/0	APPLE COMPUTER, INC. CUPERTINO, CALIF.	POWER MAC. 7600/120 PERSONAL COMPUTER	<a href="http://www.power.pc">http://www.power.pc</a>	POWER MAC.		
0/373/100/6	PROCTOR & GAMBLE	TOOTH PASTE	<a href="http://www.tooth.p.pc">http://www.tooth.p.pc</a>	CREST		
3/12547/68404/0	WARNER WELCOME	ACID REDUCER	<a href="http://www.zantac.pc">http://www.zantac.pc</a>	ZANTAC, ZANTAC 75		
0/00005/17643/4	KODAK, INC.	FILM PROCESSING	<a href="http://www.kodak.pc">http://www.kodak.pc</a>	KODAK		
:	:	:	:	:	:	
0/27242/51057/9	SONY, INC.	PERSONAL COMPUTER	<a href="http://www.sony.com.pc">http://www.sony.com.pc</a>	SONY		

FIG. 2A1

FIG. 2A2

IP / S N	REGISTRANT'S NAME	PRODUCT DESCRIPTION	TRADE/SERVICE MARKS	E-MAIL ADDRESS	STATUS
7/05089/374607	NETSCAPE COMMUNICATIONS CORP.	INTERNET NAVIGATOR	NETSCAPE, NAVIGATOR		
0/30000/010204	QUAKER, INC.	OATMEAL	QUAKER		
0/496/390/1	COLA COLA, INC.	COLA SODA	COCA - COLA, COKE		
0/7599/24245/2	WARNER BROS.	PAT METHANY AUDIO CD	GEFFEN		
:	:	:	:	...	

FIG. 2B

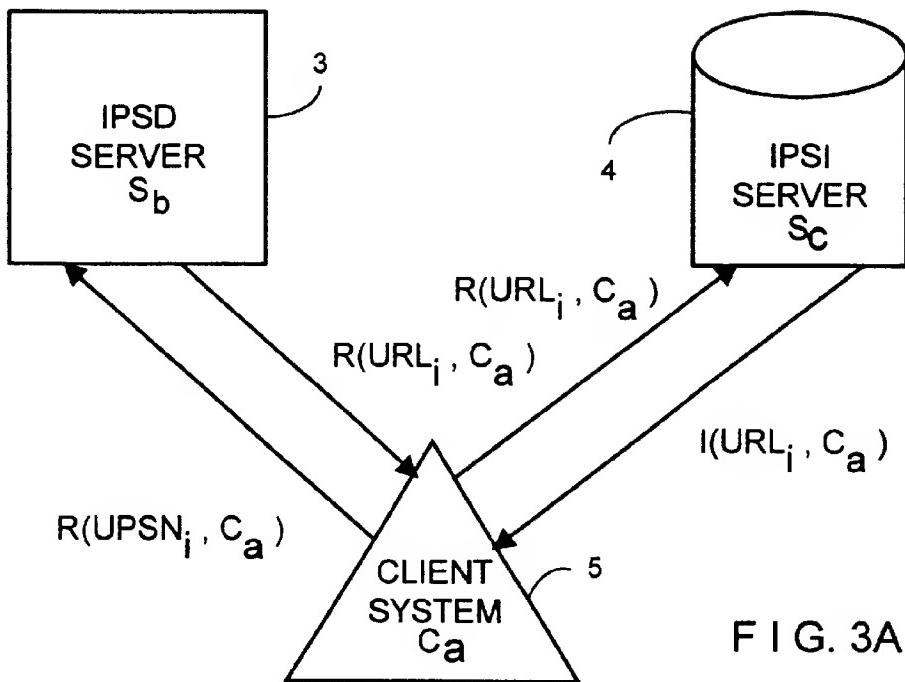
**"IPSI FINDER MODE"**

FIG. 3A

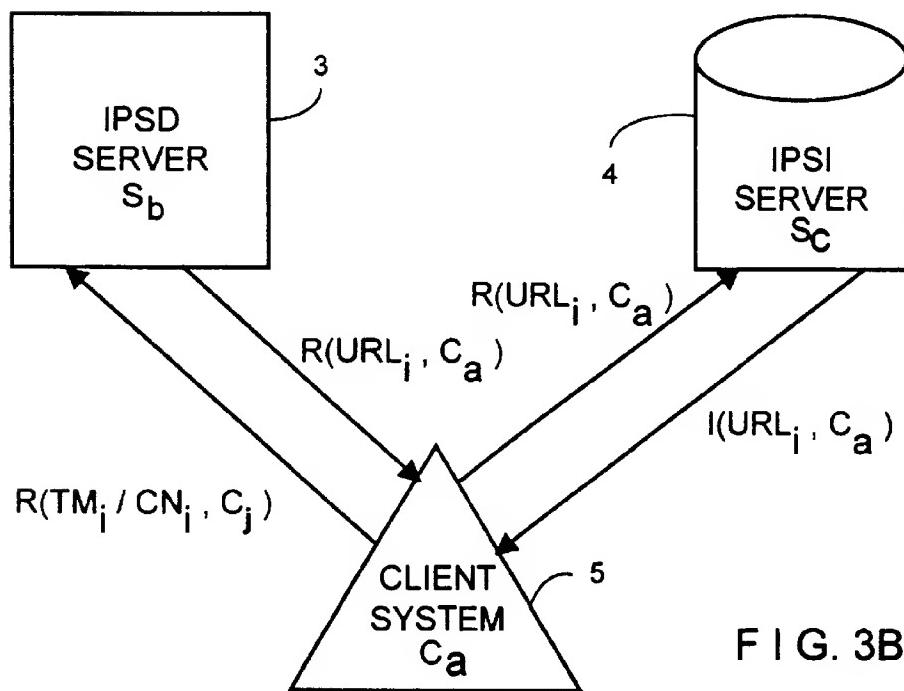
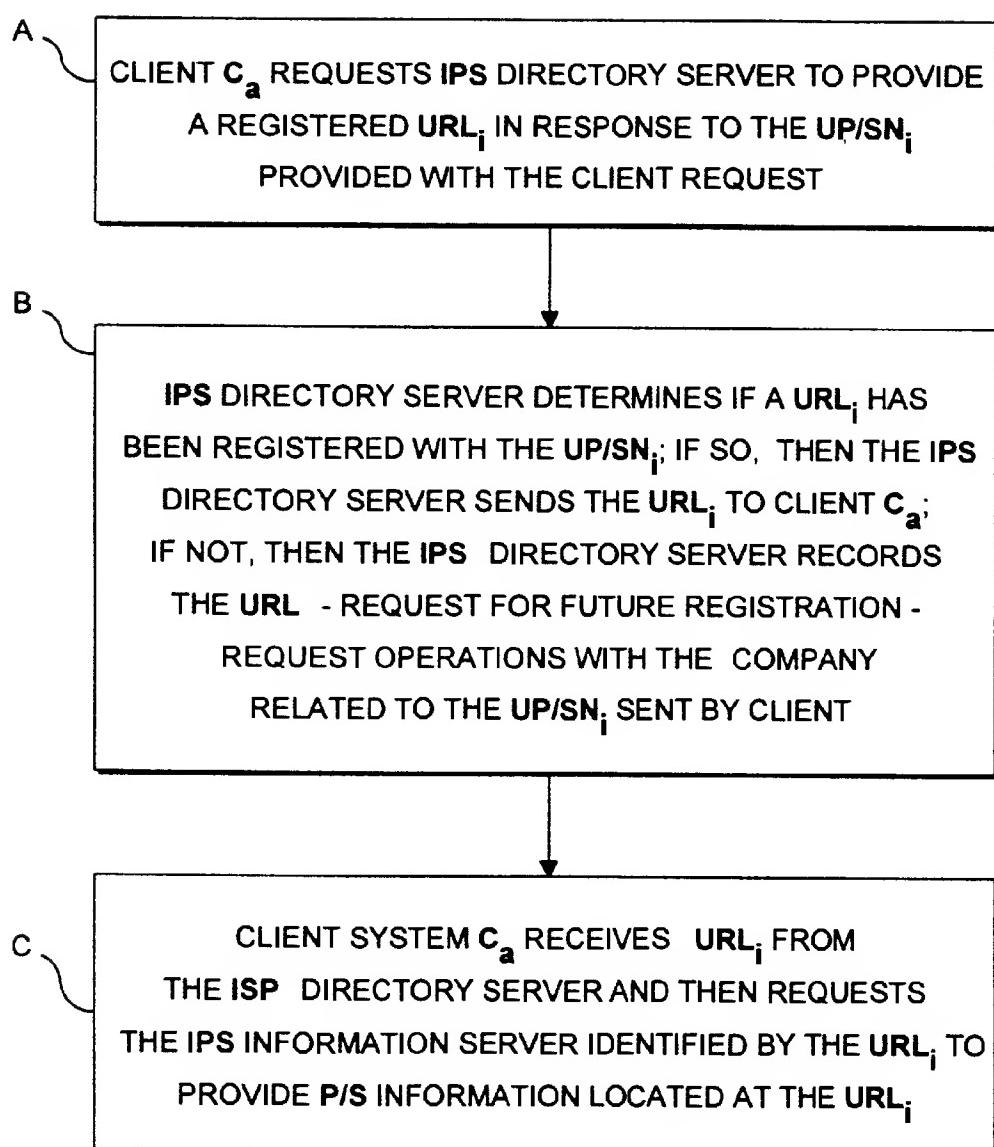
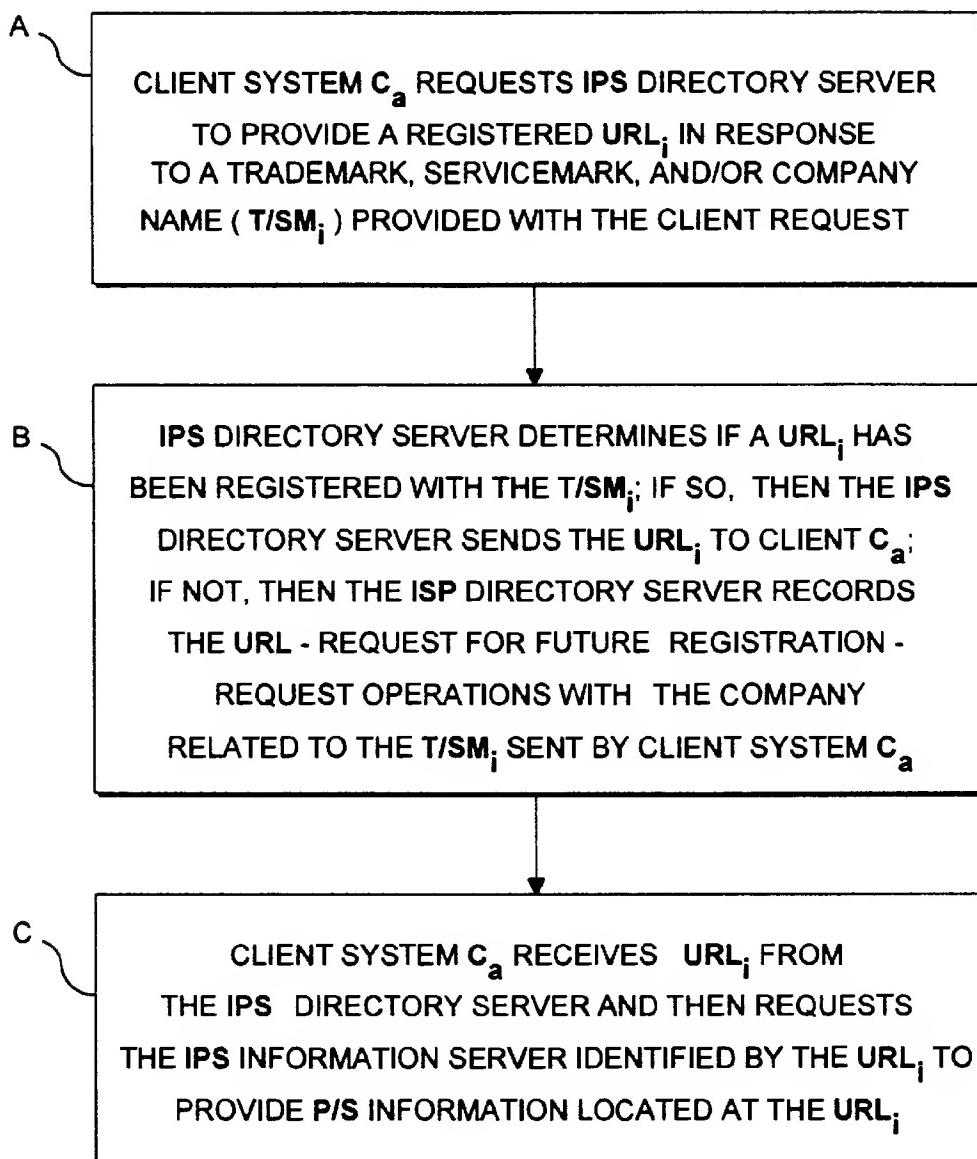
**"UPSN SEARCH MODE"**

FIG. 3B



"IPSI FINDER MODE ( FIG. 3A )"

F I G. 4A



"UP/SN SEARCH MODE ( FIG. 3B )"

F I G. 4B

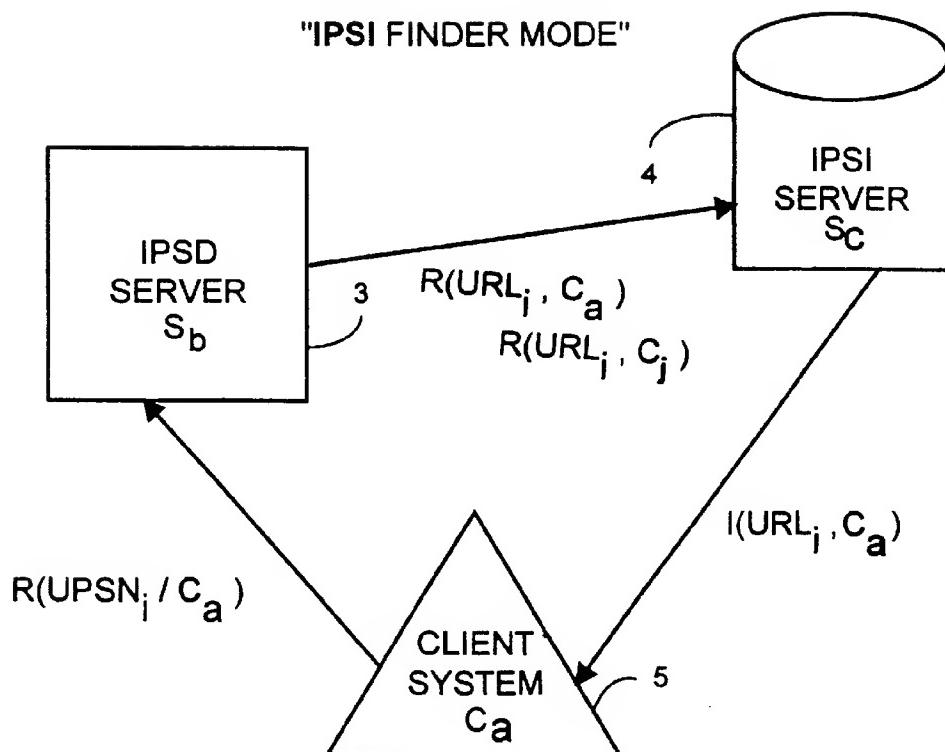


FIG. 5A

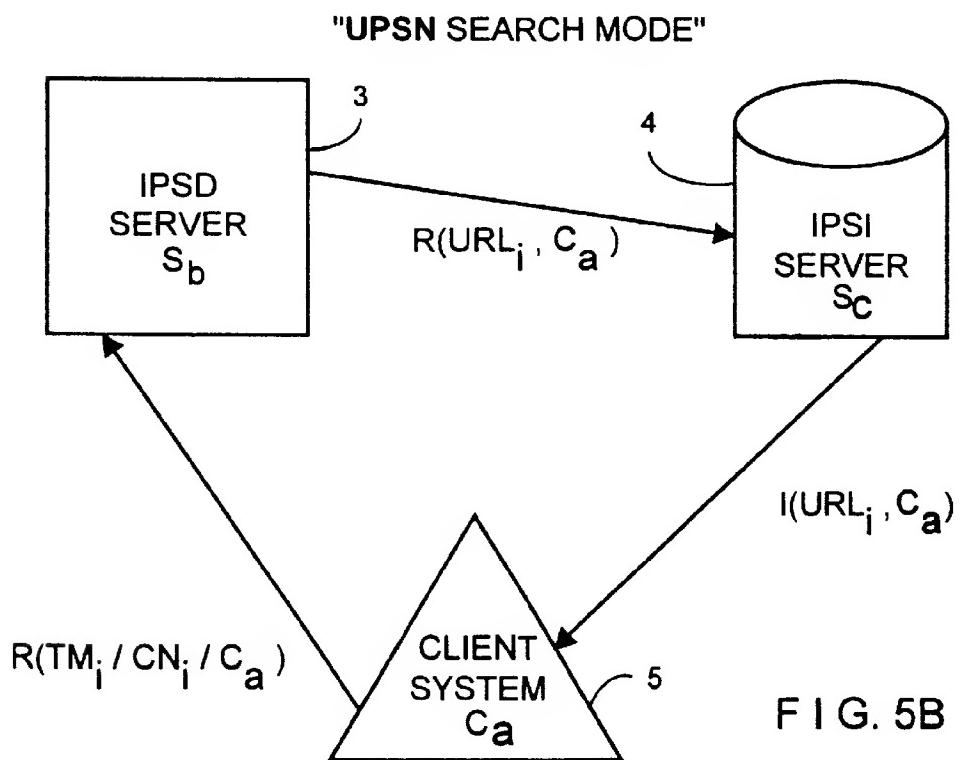
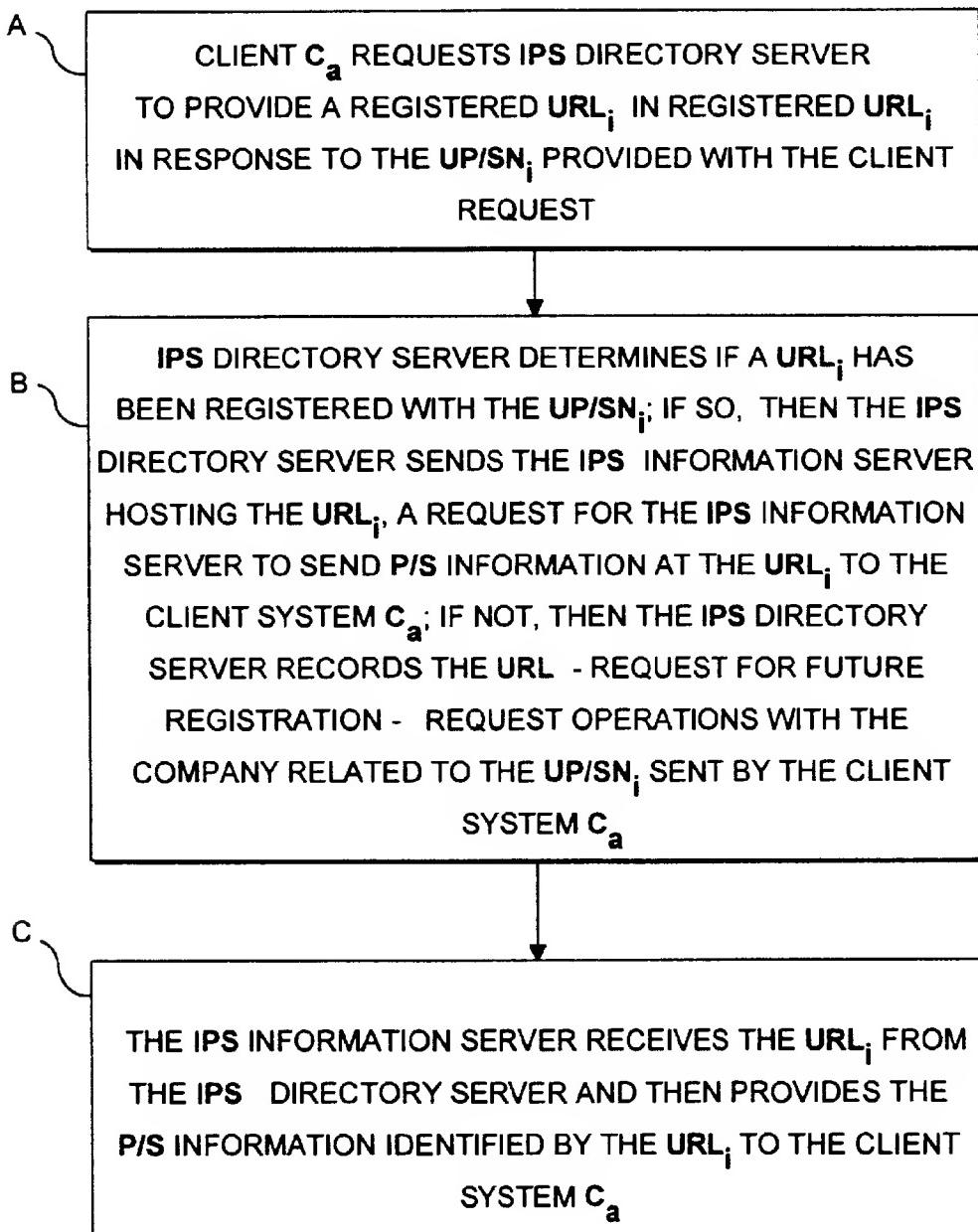
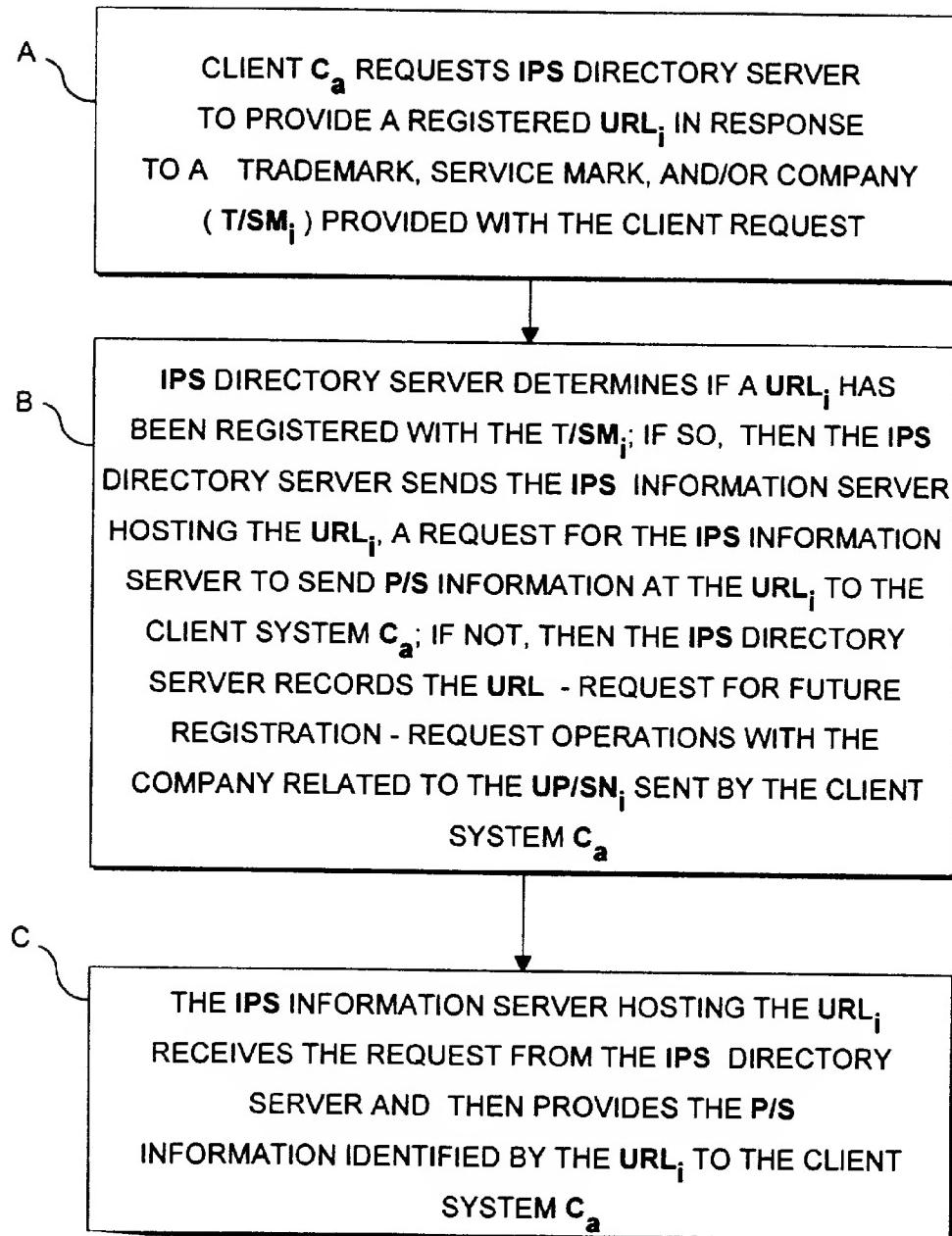


FIG. 5B



"IPSI FINDER MODE ( FIG. 5A )"

F I G. 6A



"UP/SN SEARCH MODE (FIG. 5B)"

FIG. 6B

**METHOD OF AND SYSTEM FOR FINDING  
AND SERVING CONSUMER PRODUCT  
RELATED INFORMATION OVER THE  
INTERNET USING MANUFACTURER  
IDENTIFICATION NUMBERS**

**RELATED CASES**

This is a Continuation-in-Part of application Ser. No. 08/736,798 entitled "System And Method For Finding Product And Service Related Information On The Internet" filed by Thomas J. Perkowski on Oct. 25, 1996, now U.S. Pat. No. 5,918,214, and incorporated herein by reference in its entirety.

**BACKGROUND OF INVENTION**

**1. Field of Invention**

The present invention relates to a system and method for finding product and service related information on the International Information Infrastructure (e.g. the Internet).

**2. Brief Description of the Prior Art**

Presently, an enormous amount of time, money and effort is being expended by companies in order to advertise and sell their products and services, and post-purchase product-related information, warranty service and the like. For decades, various types of media have been used to realize such fundamental business functions.

In recent times, there has been a number of significant developments in connection with the global information network called the "Internet", which has greatly influenced many companies to create multi-media Internet Web-sites in order to advertise, sell and maintain their products and services. Examples of such developments include, for example: the Hypertext Markup Language (HTML) based World Wide Web (WWW) by Tim Berners-Lee; user friendly GUI-based Internet navigation tools, such as the Netscape® browser from Netscape Communications, Inc., the Internet Explorer™ browser from MicroSoft Corporation and the Mosaic™ browser from Spyglass Corporation; and the Virtual Reality Modelling Language (VRML) by Mark Pecse. Such recent developments have made it very easy for businesses to create 2-D Hypermedia-based Home Pages and 3-D VR Worlds (i.e. 3-D Web-sites) for the purpose of projecting a desired "corporate image" and providing a backdrop for financial investment solicitation, product and service advertisement, sales and maintenance operations.

Presently, a person desiring to acquire information about any particular product has numerous of available search options. In particular, he or she may attempt to directly contact the manufacturer, wholesaler or reseller via telephone, US mail, e-mail, or the company's World Wide Web-site (WWW), if such a one exists. In order to acquire product information through the seller's WWW site, the inquirer must first determine the location of its WWW site (i.e. Internet address) which oftentimes can involve using Internet Search engines such as Yahoo®, AltaVista™, WebCrawler™, Lycos™, Excite™, or the like. This can be a very time consuming process and may lead to a dead end. Upon obtaining the Internet address one must then review the home page of the company's Web-site in order to find where, if at all, information about a particular product resides on the Website. This search process can be time consuming and therefore expensive (in terms of Internet time) and may not locate the desired information on the product of interest.

5 In some instances, product brochures bear a preprinted Internet address designed to direct or point prospective customers to a particular Web-site where more detailed product information can be found. A recent example of this "preprinted Web Address" pointing technique is the 1996 product brochure published by the Sony Corporation for its Sony® PCV-70 Personal Computer, which refers prospective customers to the Sony Web Address "http://www.sony.com/pc". While this approach provides a direct way of finding product and service related information on the Internet, it is not without its shortcomings and drawbacks.

10 15 In particular, when a company improves, changes or modifies an existing Web-site which publishes product and/or service advertisements and related information, it is difficult (if not impossible) not to change the Internet locations (i.e. Web addresses) at which such product and/or service advertisements and related information appear. Whenever a company decides or is forced to change any of its advertising, marketing and/or public relations firms, there is a substantial likelihood that new Web-sites will be created and launched for particular products and services, and that the Web addresses of such new Web-sites will no longer correspond with the Web addresses on preprinted product and service brochures in currently in circulation. This can result in pointing a consumer to erroneous or vacant Web-sites, which present either old or otherwise outdated product and/or service information, and thereby possibly adversely influencing the consumer's purchasing decision.

20 25 30 Moreover, when a company launches a new Web-site as part of a new advertising and marketing campaign for a particular product or service, any preprinted advertising or marketing material relating to such products and services will not reflect the new Web-site addresses which the campaign is promoting for consumer visitation. This fact about preprinted advertising media renders it difficult to unify new and old advertising media currently in circulation into thematically coherent advertising and marketing campaign. In short, the inherently static nature of the "preprinted Web address" pointing technique described above is wholly incapable of adjusting to the dynamic needs of advertising, marketing and public relations firms alike.

35 40 45 In addition to the above-described techniques, I-World by Mecklermedia has recently launched a commercial product finder database on the Internet called "Internet Shopper". Notably, the "Internet Shopper" database is organized by specific types of product categories covering computer and telecommunication related technologies. While this product information finding service may be helpful to potential consumers of computer or communication equipment, nevertheless it fails to provide an easy way to find information on previously purchased products, or on products outside of the field of communication or computer technology. Consequently, the value of this prior art technique is limited to those considering the purchase of products catalogued within the taxonomy of the "Internet Shopper" directory.

50 55 60 65 In view of the inherent limitations of I-World's "Internet Shopper" and other product finding directories on the Internet, such as "NetBuyer" by Computer Shopper (at "http://www.netbuyer.com"), the National Information Infrastructure Testbed (NIIT) organization has recently formed a "confidential committee of NIIT members" under the title "Universal Product and Service Code Project". The stated problem addressed by this Project is to determine how to locate specific goods and services on the Internet, and how to compare prices and other critical market information. As publicized in a NIIT Project Abstract, the "Universal

Product and Service Code Project seeks to make it easier to electronically locate goods and services on the Internet using universal product and service identifiers and locators. As stated in the Project Abstract, the "NIIT believes that changing the way in which Internet information is organized is fundamental to solving this problem. In the Universal Product and Service Code Project, NIIT members are currently exploring how coding structures can help organize information about products and services accessible using the Internet. NIIT's goal is to inform the development of formalized coding standards that can be used nationally and internationally so that users can locate goods and services through simple searching and browsing methods. In turn, more advanced features, such as comparison shopping, can be added as "intelligent agent" software programs are refined to enable users to search and retrieve products and services linked to these structures.

While the NIIT's Universal Product and Service Code Project seeks ways of locating specific goods and services on the Internet, all proposals therefor recommend the development of formalized coding standards and searching and browsing methods which are expensive and difficult to develop and implement on a world-wide basis. Moreover, such sought after methods will be virtually useless to consumers who have already purchased products and/or services and now seek product and/or service related information on the Internet.

Thus, it is clear that there is great need in the art for a system and method for finding commercial product and service information on the Internet, in a way which avoids the shortcomings and drawbacks of prior art systems, proposals, and methodologies.

#### OBJECTS AND SUMMARY OF INVENTION

Accordingly, a primary object of the present invention is to provide a novel system and method for finding product and service related information on the Internet, while avoiding the shortcomings and drawbacks of prior art systems and methodologies.

Another object of the present invention is to provide such a system and method, which will accelerate the acceptance of the electronic marketplace on the Internet, particularly by consumers and small businesses alike.

Another object of the present invention is to provide such a system and method, wherein virtually any type of product or service can be registered with the system by symbolically linking or relating (i) its preassigned Universal Product or Service Number (e.g. UPC number) or at least the Manufacturer Identification Number (MIN) portion thereof with (ii) the Uniform Resource Locators (URLs) of one or more information resources on the Internet (e.g. the home page of the manufacturer's Web-site) related to such products or services.

Another object of the present invention is to provide such a system and method with an improved Internet browser or Internet application tool having both an "Internet Product/Service Information (IPSI) Finder" button for entering the "IPSI Finder Mode" of the system when it is selected, and also a "Universal Product/Service Number (UPSN) Search" button for entering the "UPSN Search Mode" when the "UPSN Search" button is selected.

Another object of the present invention is to provide such a system, wherein when the system is in its IPSI Finder Mode, a predesignated information resource (e.g. advertisement, product information, etc.) pertaining to any commercial product or service registered with the system

can be automatically accessed from the Internet and displayed from the Internet browser by simply entering the registered product's UPN or the registered service's USN into the Internet browser.

Another object of the present invention is to provide such a system, wherein during the "UPSN Search Mode" of the system, a predesignated information resource (e.g. advertisement, product information, etc.) pertaining to any commercial product or service registered with the system can be automatically accessed from the Internet and displayed from the Internet browser by simply entering the registered product's trademark(s) and/or associated company name into the Internet browser.

Another object of the present invention is to provide such a system, wherein a predesignated information resource pertaining to any commercial product or service having been assigned a Universal Product Number (UPN) or Universal Service Number (USN) can be accessed from the Internet and displayed from the Internet browser by simply selecting its IPSI Finder button and then entering the UPN or USN numeric string into a dialogue box which pops up on the display screen of the Internet browser program.

Another object of the present invention is to provide such a system in which a relational database, referred to as "an Internet Product and Service Directory (IPSD)," is realized on one or more data-synchronized PSD Servers for the purpose of registering product and service related information, namely: (i) information representative of commercial product descriptions, the trademarks used in connection therewith, the company names providing and/or promoting such products, the e-mail addresses of such companies, and the corresponding URLs on the Internet specifying current (i.e. up-to-date) Internet Web-site locations providing product-related information customized to such products; and (ii) information representative of commercial service descriptions, the servicemarks used in connection therewith, the company names providing and/or promoting such services, the E-mail addresses of such companies, and the corresponding URLs on the Internet specifying current (i.e. up-to-date) Internet Web-site locations providing service-related information customized to such services.

Another object of the present invention is to provide such a product information finding system, wherein the URLs symbolically linked to each registered product in the PSD Servers thereof are categorized as primarily relating to Product Advertisements, Product Specifications, Product Updates, Product Distributors, Product Warranty/Servicing, and/or Product Incentives (e.g. rebates, discounts and/or coupons), and that such URL categories are graphically displayed to the requester by way of easy-to-read display screens during URL selection and Web-site connection.

Another object of the present invention is to provide a novel method of carrying out electronic-type commercial transactions involving the purchase of products and services which are advertised on the Internet at uniform resource locations (URLs) registered with the IPSI system of the present invention.

Another object of the present invention is to provide a novel system and method of finding the UPN or USN associated with any particular registered product or service, respectively, by simply selecting a GUI button on the Internet browser display screen in order to enter a "UPSN Search Mode", whereby (i) a dialogue box is displayed on the display screen requesting any known trademarks associated with the product, and/or the name of the company that

makes, sells or distributes the particular product, and (ii) the corresponding UPN (i.e., UPC number or EPC number) registered with the IPSD Servers is displayed to the user for acceptance, whereupon the Internet information resource locators (URLs) are automatically accessed from the IPSD Servers and displayed on the display screen of the Internet browser for subsequent URL selection and Web-site connection.

Another object of the present invention is to provide such a system and method, wherein during the UPSN Search Mode, the UPN (e.g. UPC number) associated with any registered product can be found within the database of the IPSD Server using any trademark(s) and/or the company name commonly associated with the product, and the USN number associated with any registered service can be found within the database of the IPSD Server using any servicemark(s) and/or the company name commonly associated with the service.

Another object of the present invention is to provide such a system and method in the form of an electronic kiosk installed within a store and having an automatic projection-type, laser scanning bar code symbol reader for reading the UPC numbers on products being offered for sale in the store, and also a video display screen for displaying product-related information accessed from hyper-linked Web-sites on the Internet.

Another object of the present invention is to provide a novel method of constructing a relational database for use within the product and service information finding system of the present invention.

Another method of the present invention is to provide such a method of database construction, wherein the relational database is initially "seeded" with (i) the six digit UPC Manufacturer Identification Numbers (MIN) incorporated into the first six characters of each UPC number applied to the products thereof and (ii) the URLs of the Web-site home pages of such manufacturers, and is subsequently extended and refined with the participation of each registered manufacturer (and/or product distributor) by adding to the database (iii) the 12 digit UPC numbers assigned to each product sold thereby and (iv) the URLs symbolically linked to each such corresponding product.

Another object of the present invention is to provide such a system and method, in which Web-site-based advertising campaigns can be changed, modified and/or transformed in virtually any way imaginable by simply restructuring the symbolic links between the products and/or services in the campaign using current (i.e. up-to-date) Web-site addresses at which Web-site advertisements and information sources related thereto are located on the Internet.

Another object of the present invention is to provide a novel system and method of automatically soliciting companies to register their products and services within the databases of such IPSD Servers in order that product and service related information of a multimedia nature (e.g. Web-sites), once registered therewith, can be easily found on the Internet by any potential consumer using the system and method of the present invention.

These and other objects of the present invention will become apparent hereinafter and in the claims to Invention.

#### BRIEF DESCRIPTION OF THE DRAWINGS

For a more complete understanding of how to practice the Objects of the Present Invention, the following Detailed Description of the Illustrative Embodiments should be read in conjunction with the accompanying Drawings, wherein:

FIG. 1 is a schematic diagram of a first illustrative embodiment of the product and service information finding system of the present invention shown embedded with the infrastructure of the global computer communications network known as the "Internet", and comprising a plurality of data-synchronized Internet Product and Service Directory (IPSD) Servers connected to the infrastructure of the Internet, a plurality of Internet Product and Service Information (IPSI) Servers connected to the infrastructure of the Internet, and a plurality of Client Systems connected to the infrastructure of the Internet;

FIG. 1A is a schematic representation of an exemplary display screen produced by a graphical user interface (GUI) based web browser program running on a Client System and providing an on-screen IPSI Finder button and an on-screen UPSN Search button for carrying out the IPSI finding method of the present invention;

FIG. 1B is a schematic representation of an exemplary display screen produced by a GUI-based web browser program running on a Client System and providing an on-screen IPSD Web-site Finder button for instantly connecting to the IPSD Web-site and carrying out the Internet Product and Service Information finding method of the present invention;

FIG. 2A1 is a schematic representation of the relational-type IPSI Registrant Database maintained by each IPSD Server that is configured into the IPSI finding system of the illustrative embodiment of the present invention, showing the information fields for storing (i) the information elements representative of the UPN (e.g. UPC numeric data structure, National Drug Code (NDC) numeric data structure, and/or European Product Code (EPC) alphanumeric data structure), URLs, trademark(s) (TM<sub>i</sub>), Company Name (CN<sub>i</sub>), Product Description (PD<sub>i</sub>) and E-mail Address (EMA<sub>i</sub>) thereof symbolically-linked (i.e. related) for a number of exemplary IPSI Registrants listed (i.e. registered) with the IPSI Registrant Database maintained by each IPSD Server, and (ii) the information elements representative of the UPN (e.g. UPC numeric data structure, National Drug Code (NDC) numeric data structure, and/or European Product Code (EPC) alphanumeric data structure), URLs, servicemark(s) (SM<sub>i</sub>), Company Name (CN<sub>i</sub>), Service Description (SD<sub>i</sub>) and E-mail Address (EMA<sub>i</sub>) thereof symbolically-linked for a number of exemplary IPSI Registrants registered with the IPSI Registrant Database maintained by each IPSD Server;

FIG. 2A2 is a schematic representation of the information subfield structure of the URL Information Field of the IPSD Database of FIG. 2A1, showing the Product Advertisement Information Field, the Product Specification (Description) Information Field, the Product Update Information Field, the Product Distributor Information Field, the Product Warranty/Servicing Information Field, the Product Incentive Information Field thereof, the Product Review Information Field, and Miscellaneous Information Field;

FIG. 2B is a schematic representation of the relational-type Non-IPSI Registrant Database maintained by each IPSD Server that is configured into the IPSI finding system of the illustrative embodiment of the present invention, showing the information fields for storing (i) the information elements representative of the Company Name (CN<sub>i</sub>), Trademark(s) (TM<sub>i</sub>) registered by the associated Company, and E-Mail Address (EMA<sub>i</sub>) thereof symbolically-linked for a number of exemplary Non-IPSI registrants listed within the Non-IPSI Registrant Database maintained by each IPSD Server, and (ii) the information elements representative of

the Company Name (CN<sub>i</sub>), Servicemark(s) (SM<sub>i</sub>) registered by the associated Company, and E-Mail Address (EMA<sub>i</sub>) thereof symbolically-linked for a number of exemplary Non-IPSI registrants listed within the Non-IPSI Registrant Database maintained by each IPSD Server;

FIG. 3A is a schematic diagram illustrating the high level structure of a first type of communication protocol that can be used among the Client System C<sub>a</sub>, the IPSD Server S<sub>b</sub>, and the IPSI Server S<sub>c</sub> of the IPSI finding system hereof when the GUI browser program running on the Client System is in its IPSI Finder Mode of operation, requesting as input a UPSN (i.e. UPN or USN data structure) to determine the URL(s) of the corresponding product (or service) registered therewith;

FIG. 3B is a schematic diagram illustrating the high level structure of a first type of communication protocol that can be used among the Client System C<sub>a</sub>, the IPSD Server S<sub>b</sub>, and the IPSI Server S<sub>c</sub> of the IPSI finding system hereof when the GUI browser program on the Client System is in its UPSN Search Mode of operation, requesting as input a trademark (or servicemark) and/or company name in order to determine the UPSN (i.e. UPN or USN data structure) of the corresponding product (or service) and thus the URL(s) registered therewith;

FIG. 4A is a high level flow chart illustrating the steps involved in carrying out the communication protocol shown in FIG. 3A when the Client System is in its IPSI Finder Mode of operation;

FIG. 4B is a high level flow chart illustrating the steps involved in carrying out the communication protocol shown in FIG. 3A when the Client System is in its UPSN Search mode of operation;

FIG. 5A is a schematic diagram illustrating the high level structure of a second type of communication protocol that can be used among the Client System C<sub>a</sub>, the IPSD Server S<sub>b</sub>, and the IPSI Server S<sub>c</sub> of the IPSI finding system hereof when the GUI browser program on the Client System is in its IPSI Finder Mode of operation, requiring as input a UPSN to determine the URL(s) of the corresponding product (or service) registered therewith;

FIG. 5B is a schematic diagram illustrating the high level structure of a second type of communication protocol that can be used among the Client System C<sub>a</sub>, the IPSD Server S<sub>b</sub>, and the IPSI Server S<sub>c</sub> of the IPSI finding system hereof when the GUI browser program on the Client System is in its UPSN Search Mode of operation, requiring as input a trademark (or servicemark) and/or company name in order to determine the UPSN of the corresponding product (or service) and thus the URL(s) registered therewith;

FIG. 6A is a high level flow chart illustrating the steps involved in carrying out the communication protocol shown in FIG. 5A when the Client System is in its IPSI Finder Mode of operation; and

FIG. 6B is a high level flow chart illustrating the steps involved in carrying out the communication protocol shown in FIG. 5A when the Client System is in its UPSN Search mode of operation.

#### DETAILED DESCRIPTION OF THE ILLUSTRATIVE EMBODIMENTS OF THE PRESENT INVENTION

Referring to the figures shown in the accompanying Drawings, like structures and elements shown throughout the figures thereof shall be indicated with like reference numerals.

Overview Of The Internet Product And Service Information (IPSI) Finding System Hereof

As shown in FIG. 1, the product/service information finding system of the present invention is generally indicated by reference numeral 1 and comprises an arrangement of system components, namely: a globally-based digital telecommunications network (such as the Internet) 2 having an infrastructure (including Internet Service Providers (ISPs), Network Service Providers (NSPs), routers, telecommunication lines, channels, etc.) for supporting packet-switched type digital data telecommunications using the TCP/IP networking protocol well known in the art; one or more Internet Product and Service Directory (IPSD) Servers, each indicated by reference numeral 3 and being connected to the Internet at strategically different locations via the Internet infrastructure and data-synchronized with each other in order that each such Server maintains mirrored a database structure as represented in FIGS. 2A1 through 2B; a plurality of Internet Product and Service Information (IPSI) Servers, each indicated by reference numeral 4 and being connected to the Internet via the Internet infrastructure; and a plurality of User (or Client) Computers, each indicated by reference numeral 5 and being connected to the Internet via the Internet infrastructure.

In a first illustrative embodiment of the system shown in FIG. 1, each Client Computer 5 has an GUI-based Internet browser program (e.g. Netscape, Internet Explorer, Mosaic, etc.) which has been provided with a suitable plug-in type module constructed in such as way to provide the functionalities of the present invention. An exemplary display screen produced by the GUI-based web browser program is set forth in FIG. 1A. As shown, the GUI-based web browser program provides an onscreen IPSI Finder Button 8 and an on-screen US/PN Search Button 9 for carrying out the IPSI finding method of the present invention. The details of these functions will be described hereinafter.

In an alternative embodiment of the system shown in FIG. 1, each Client Computer has a conventional GUI-based web browser program (e.g. Netscape, Internet Explorer, Mosaic, etc.) with a plug-in type module, such as CyberFinder™ navigational software by Aladdin Systems, Inc., of Watsonville, Calif., that provides an on-screen graphical icon for a "IPSI Web-site Finder" function. An exemplary display screen 10 produced by such a GUI-based web browser program is set forth in FIG. 1B. As shown, the on-screen IPSI Web-site Finder icon functions as an "IPSI Web-site Finder" Button 11 for instantly connecting the Client System to the IPSI Web-site (i.e., on each IPSD Server) and carrying out the Internet Product and Service Information (IPSI) finding method of the present invention. Upon selecting this button (e.g. by a clicking of the mouse), the user is automatically connected to the IPSI Web-site (supported on each IPSD Server), at whose "home page" appears the IPSI Finder and UPSN Search buttons described above appear and functionalities represented thereby. The URL for the home page of the IPSI Web-site should be selected with marketing considerations in mind, for example, "<http://www.ipf.com>" or "<http://www.ipsi.com>" similar in form with the URLs of other information search-engines and directories currently available on the Internet. Alternatively, the URL of the home page of the PSI Web-site can be recorded as a browser "bookmark" for easy recall and access through a conventional GUI-based Internet browser. Once at the home page of the IPSI Web-site, an Internet user can find product and service related information on the Internet in essentially the same way as when using the web browser program of FIG. 1A.

In the illustrative embodiment, each synchronized IPSD Server **3** can be realized by, for example, the PowerMac® Internet Server from Apple Computer, Inc. or any other suitable computing machine that can perform the function of a Server in a web-based, client-server type computer system architecture of the illustrative embodiment. As shown in FIG. 1, each IPSD Server is interfaced with an ISP **13** in a conventional manner. The actual number of IPSD Servers used in any particular application will depend on various factors including, for example, user demand, Internet traffic conditions, network router capacity and performance, etc. Each such IPSD Server is assigned a static TCP/IP address and a unique domain name on the Internet. Each IPSD Server is also provided with (i) Internet networking software to support the TCP/IP networking protocol, (ii) an Application Programming Interface (API) for Web-site and application program development and (iii) Web-site server software for creating and maintaining the IPSI Registrant Database and the Non-IPSI Registrant Database schematically illustrated in FIGS. 2A and 2B, respectively. Such databases can be expressed in the 4th Dimension® SQL Language, the Sybase language, or any other suitable database language which allows for database programming and database connectivity over the Internet. A suitable development program for creating a dynamic Web-site with the integrated database structures of FIGS. 2A1, 2A2 and 2B is the "4D Web SmartServer" from ACI, Inc. Data synchronization among such databases can be achieved using conventional data synchronization techniques well known in the art. In addition, a backup and mirroring program can be used to maintain data security. Preferably, the synchronized IPSD Servers are maintained by a team of network managers under the supervision of one or more webmasters.

Similarly, each IPSI Server **4** can be realized by, for example, the PowerMac® Internet Server from Apple Computer, Inc., or any other computing machine that can perform the function of a Server in a web-based, client-server type computer system architecture of the illustrative embodiment. As shown in FIG. 1, each IPSI Server is interfaced with an ISP **13** in a conventional manner. Each such IPSI Server is assigned a static TCP/IP address and a unique domain name on the Internet. Each IPSI Server is also provided with (i) Internet networking software to support the TCP/IP networking protocol, (ii) an Application Programming Interface (API) for application program development and (iii) Web-site server software for creating and maintaining hypermedia-type Web-sites containing product and/or service related information of a multi-media nature. Such Web-sites can be expressed in HTML and/or VRML or any other suitable language which allows for Web-site construction and Web-site connectivity. Web-site management software, such as Adobe® SiteMill™, should be used to maintain correct hyper-links for any particular Web-site. Preferably, the IPSI Servers are maintained by a team of network managers under supervision of one or more webmasters.

Each User (i.e. Client) Computer **5** can be realized by any computing system employing operating system (OS) software (e.g. Macintosh, Windows, Unix etc.) which supports an Internet browser program (e.g. Netscape, Internet Explorer, Mosaic, etc.) which includes Internet networking software that supports the TCP/IP networking protocol, and provides a GUI-based Web browser interface. Alternatively, Client Systems may also be realized by any of the following systems: (i) a Newton MessagePad 130 (running the Newton 2.0 Operating System and NetHopper™ Internet Software); (ii) a Pippin™ computer system from Apple Computer, Inc.;

(iii) a network computer (NC) that supports the Java™ programming language and Java applets expressed therewith; (iv) a Sony® WebTV Internet Terminal (supported by the WebTV Service provided by WebTV Network, Inc.); or the like. As shown in FIG. 1, each Client Computer is interfaced with an ISP **13** in a conventional manner. Each such Client System may be assigned a static TCP/IP address and a unique domain name on the Internet, or one may be dynamically assigned thereto by way of its ISP depending on its connectivity. Optionally, each Client System may include Web-site server software for creating and maintaining one or more hypermedia-type Web-sites in a manner well known in the art.

Typically, each Client System **5** will be maintained by consumers (and/or) potential consumers of products and/or services, about which information can be found on the Internet. It is understood, however, that Client System can be realized in the form of computer-based kiosks located in supermarkets, department stores, retail outlets, or other public location where products and/or services are being sold or offered for sale, and/or serviced. In one embodiment of the computer-based kiosk, a visual display screen, keyboard and pointing device would be provided in the conventional manner to enable consumers to operate its GUI-based browser and thus carry out the method of the present invention. In an alternative embodiment of the kiosk-based Client System, an integrated bar code reader is provided for reading UPC symbols printed on products (as well as UPNs printed on service-related brochures), and a visual display screen is provided for viewing product and service related information automatically displayed thereon in response to the entry of the UPSN information scanned into the system. The Database Structure of the IPSD Server

In the illustrative embodiment of the present invention, each data-synchronized IPSD Server **4** of the preferred embodiment maintains at least two different relational-type databases, namely: a IPSI Registrant Database for storing information about manufacturers and/or service providers whose products and/or services are registered with the system; and a Non-IPSI Registrant Database for storing information about manufacturers and/or service providers whose products and/or services are not registered with the system. A schematic representation of the IPSI Registrant Database is shown in FIG. 2A1, whereas a schematic representation of the Non-IPSI Registrant Database is shown in FIG. 2B.

As shown in FIG. 2A1, the relational-type IPSI Registrant Database maintained by each IPSD Server comprises a plurality of labeled information fields for each product or service "registered" therewith, namely: an IP/SN Information Field for storing information (e.g. numeric or alphanumeric string) representative of the Universal Product or Service Number (e.g. twelve digit UPC number) assigned to the product or service; a Company Name Information Field for storing information (e.g. numeric or alphanumeric string) representative of the name of the company making, selling or distributing the corresponding product or service; a URL Information Field for storing information (e.g. numeric or alphanumeric string) representative of the Universal Resource Locator (URL) or Universal Resource Locators (URLs) at which information (or the multimedia type) can be found on the Internet relating to the corresponding product or service; a Trademark/Servicemark Information Field for storing information (e.g. text and/or alphanumeric strings) representative of each trademark used in connection with the promotion, sale, distribution and/or use of the corresponding product or service, and preferably registered with

the United States Patent and Trademark Office (USPTO) or other governmental agency; a Product Description Information Field for storing information (e.g. text strings) descriptive of the corresponding product or service; an E-mail Address Information Field for storing information (e.g. numeric or alphanumeric string) representative of the e-mail address of the corresponding company (e.g. manufacturer) on the Internet; and a Status Information Field for storing information (e.g. numeric or alphanumeric string) representative of whether the company associated registered product or service has paid their monthly, quarterly or annual registration fees associated with registration within the IPSD Servers of the information finding system hereof. Notably, each information item contained with the information field shown along the same horizontal line of FIG. 2A1 are related or linked.

In general, the URL stored in the URL Information Field specifies the address of an information resource on the Internet (Web), and thus may point to any one of the following types of information resources: a HTML document or file on the World Wide Web (expressed in the HyperText Markup Language); a single record in a database; the front-end of an Internet program such as Gopher; or the results of a query made using another program. In accordance with convention, the syntactic structure of each URL generally comprises: a Protocol Specifier, such as "http", "ftp", "gopher", "news", or "mailto", and specifies the type of resource to which the URL is pointing (i.e. connecting to); a Host Indicator, represented by double slashes "//" if the URL is requesting information from a Web Server; Server Name comprising a Internet Domain Name (e.g. "www."), the address of the Web Server (e.g. "ibm."), and a designator (e.g. "com", "edu", "int", "mil", "net", "org", etc.) identifying who owns the server or where it is located; a Path Name, such as "Products/Computers/", indicating a path to the destination information file on the identified Server; and a Resource Name (including file extension, e.g. ".html"), such as "aptiva.html", identifying the actual named information file that contains existing information resource specified by the URL.

As used herein, as well as in the claims to Invention, the term "registered" and the variants thereof shall be understood to mean listed or having an entry within a database. Such listing or entry can be achieved in a variety of ways including, but not limited to the following: (i) by specific request of the associated company or business; or (ii) by the system administrator without a request and/or authorization of the corresponding company or business linked to the product or service.

Notably, each information item contained within the information field shown along the same horizontal line of FIG. 2A1 are symbolically related or linked. Different products and/or services of the same registrant or related registrant may also be linked together so that a user looking for information about a particular product or service is automatically provided URLs which are assigned to related products of the registrant. The automated linking of the URLs may satisfy the goals or objectives of a particular advertising and/or marketing campaign or product/service promotion program of the registrant company. As it may be desirable to relate particular products and services at particular points in time, the relationships therebetween can be dynamically changed dynamically within the IPSI Registrant Database. This can be effected by a straightforward database updating operation of the system administrator (or manager) who, in theory, can be located virtually anywhere throughout the world. Expectedly, such database updating

operations would be carried out using appropriate system access and security procedures well known in the art.

Inasmuch as the UPC data structure is presently employed as a universal product identifier (i.e. a primary data structure) in a majority of industries throughout the world, its twelve (12) digit numeric string will be a preferred UPN (in many applications) for purposes of carrying out the principles of the present invention. This twelve (12) digit human-readable number, printed on the bottom of each UPC label (and encoded within the bars and spaces of the UPC label itself), comprises: (i) a six digit manufacturer number assigned to the manufacturer by the Uniform Code Council, Inc. (UCC) of Dayton, Ohio, and consisting of a one digit "number system" number and a five digit manufacturer code; (ii) a five digit product number assigned to the product by the manufacturer; and (iii) a one digit modulo check digit (mathematically calculated) and added to each UPC number to ensure that the code has been read correctly by the bar code reader.

In order to provide the requester greater control over what information is actually displayed on its Client System, the URI Information Field of the IPSI Database shown in FIG. 2A1 contains a number of information subfields. As shown in FIG. 2A2, these information subfields comprise: a Product Advertisement Information Field for storing information representative of URLs pointing to information on the Internet relating to advertising and/or promotion of the product; a Product Specification (Description) Information Field for storing information representative of URLs pointing to information on the Internet relating to specifications on the product; a Product Update Information Field for storing information representative of URLs pointing to information on the Internet relating to product updates, recalls, notices, etc.; a Product Distributor Information Field for storing information representative of URLs pointing to information on the Internet relating to distribution, sale and/or ordering of the product; a Product Warranty/Servicing Information Field for storing information representative of URLs pointing to information on the Internet relating to warranty, extended warranty offerings, servicing and maintenance of the product; a Product Incentive Information Field (e.g. rebates, discounts and/or coupons) for storing information representative of URLs pointing to information on the Internet relating to rebates, discounts and sales on the product; a Product Review Information Field for storing information representative of URLs pointing to information on the Internet relating to reviews, analysis, testing, inspection and/or comparison of the product; and Miscellaneous Information Field for storing information representative of URLs pointing to information on the Internet relating to miscellaneous aspects of the product. Each URL symbolically linked to each registered product in the Registered IPSI Database is categorized within one or more of these URL categories. Preferably, the manufacturer and its advertising and marketing personnel will actively participate in the selection of the URLs and their classification into the above-defined (or like) categories. Through such participation, the business objectives of any particular company can be promoted by the product information finding system of the present invention. Preferably, easy-to-read display screens are used to display and to select URLs contained within the above-described information subfields. In this way, the requester is provided with solely the kind of product-related information which he or she seeks.

It is understood that at present, few (if any) services have been assigned a UPC number in the manner that nearly all consumer products have been assigned in the contemporary

period. In spite of this fact, however, the present invention contemplates the need and utility of widespread assignment of UPC (or similar) numbers to particular services (as well as the imprinting of UPC (or similar) symbols on printed service brochures and advertisements. Notably, assigning UPC (or like) numbers to particular services, and labeling printed and graphical brochures and advertisements with such universal numbers, will provide a number of new opportunities hitherto unavailable.

In particular, service-related information could be easily found (i.e. located and accessed) on Web-sites using the system and method of the present invention, and thereafter the service easily procured through an electronic data transaction. In accordance with the present invention, this can be achieved by uniquely identifying and assigning "particular" services by a Universal Service Code (USC) which has many if not all of the attributes of a conventional UPC. While not necessary, a single digit may be optionally added to the USC in order to demark that services, rather than products are being identified. An example of such USC labeling would be the printing of an assigned UPC label (number) on: admission tickets to a theatrical, dramatic or musical performance and/or its playbill; admission tickets to a movie; admission tickets to a concert and/or its concert program; admission tickets to a sporting event and/or its sports program; admission tickets to an art, science or history museum; admission tickets to the zoo or botanical gardens; and the like. The UPC label would be encoded to identify a particular event at which an entertainment, educational or professional service is provided. The UPC label printed on the tangible medium associated with the promotion of or access to the particular service would then be registered with the IPSI Registrant Database of the system hereof, along with the name of the provider of the service, and a list of URLs that identify the Web locations at which particular kinds of information related to the particular service can be found (in accordance with the categories of FIG. 2A2).

As shown in FIG. 2B, the Non-IPSI Registrant Database maintained by each IPSD Server comprises a plurality of labeled information fields for each product or service that is not currently registered with the IPSD Server, namely: an IPSN (i.e. IPN and ISN) information Field for storing information (e.g. numeric or alphanumeric string) representative of the Universal Product or Service Number (e.g. a number from a UPC numbering system—a UPC number)—assigned to the non-registered product or service; a Company Name Information Field for storing information (e.g. numeric or alphanumeric string) representative of the name of the company making, selling or distributing the corresponding non-registered product or service; a Trademark/Servicemark Information Field for storing information (e.g. text and/or alphanumeric strings) representative of each trademark (or servicemark) used in connection with the promotion, sale, distribution and/or use of the corresponding product or service, and preferably registered with the USPTO or other governmental agency; a Product Description Information Field for storing information (e.g. text strings) descriptive of the corresponding product or service; and an E-mail Address Information Field for storing information (e.g. numeric or alphanumeric string) representative of the e-mail address of the corresponding company (e.g. manufacturer) on the Internet; a Status Information Field for storing information (e.g. numeric or alphanumeric string) representative of whether the company associated non-registered product or service has been solicited by the IPSD Server, and on what dates registration solicitation has

occurred. Notably, each information item contained with the information field shown along the same horizontal line of FIG. 2A1 are related or linked. The information required to construct the Non-IPSI Registrant Database shown in FIG. 2B can be readily obtained from a number of commercially or publicly available information sources (e.g., the Universal Code Council, Inc., Dayton, Ohio; Quickresponse Services, Inc. Of Richmond, Calif.; General Electric Information Services (GEIS) of Delaware, Md.; Infotest International, <http://www.infotest.com>, etc.).

#### Communication Protocols For Carrying Out The System And Method Of The Present Invention

In general, there are a number of possible communication protocols that can be used to carry out the system and method of the present invention. In FIGS. 3A and 3B, a first communication protocol is schematically depicted for a first system having both the IPSI Finder and UPSN Search Modes of operation, whereas the basic operations carried out thereby are shown in FIGS. 4A and 4B. In FIGS. 5A and 5B, a second communication protocol is schematically depicted for both the IPSI Finder and UPSN Search Modes of operation, whereas the basic operations carried out thereby are shown in FIGS. 6A and 6B. The details of such protocols will be described below.

Referring to FIG. 3A, the high level structure is shown for a first-type of communication protocol that can be used among the Client System  $C_a$ , the IPSD Server  $S_b$ , and the IPSI Server  $S_c$  of the IPSI finding system hereof when the GUI browser program on the Client System is in its IPSI Finder Mode of operation. FIG. 4A provides a high level flow chart illustrating the steps involved in carrying out this communication protocol when the Client System is in its IPSI Finder Mode of operation.

In order to enter the IPSI Finder mode of the system, the user selects the "IPSI Finder" button on the GUI-based browser display screen. Then at Block A of FIG. 4A, a UPSN is provided as input to IPSD Server  $S_b$ , and in response thereto the Client System  $C_a$  requests the IPSD Server  $S_b$  to provide each registered URL<sub>i</sub> stored in the IPSI Registrant Database.

At Block B in FIG. 4A, the IPSD Server  $S_b$  analyses the IPSI Registrant Database shown in FIG. 2A1 to determine whether or not a symbolically linked URL<sub>i</sub> has been registered with UPSN<sub>i</sub> that has been provided as input. If so, then the IPSD Server sends the symbolically linked URL<sub>i</sub> to the Client System  $C_a$ . If not, then the IPSD records in the URL-request in the Non-IPSI Registrant Database shown in FIG. 2B.

At Block C in FIG. 4A, the Client System  $C_a$  receives the URL<sub>i</sub> from the IPSD Server. Then, in response to a URL selection query based on the content of information subfields shown in FIG. 2A2 and displayed on the screen of the Client System  $C_a$ , the client system  $C_a$  requests the IPSI Server, identified by the user selected URL<sub>i</sub>, to provide the product or service information located by the registered URL<sub>i</sub>. Having accessed and displayed such product or service related information at the Client System, the user can review the information at the specified URL<sub>i</sub>, acquire knowledge about the product or service, and may, if the option is provided at the URL-specified Web-site, purchase the product or procure (i.e. contract for) the service by way of an on-screen electronic commercial transaction. Such commercial transaction can involve product ordering, delivery specification, and financing through the use of credit or debit card transactions, COD arrangements, or any other financial arrangement acceptable to the vendor of the product or service.

Referring to FIG. 3B, the high level structure is shown for the first-type of communication protocol that can be used among the Client System  $C_a$ , the IPSD Server  $S_b$ , and the IPSI Server  $S_c$  of the IPSI finding system hereof when the GUI browser program on the Client System is in its UPSN Search Mode of operation. FIG. 4B provides a high level flow chart illustrating the steps involved in carrying out this communication protocol when the Client System is in its UPSN Search Mode of operation.

In order to enter the UPSN Search Mode of the system, the user selects the “UPSN Search” button on the GUI-based browser display screen. Then at Block A of FIG. 4B, a trademark  $TM_i$  (or servicemark  $SM_i$ ) and/or a company name  $CN_i$  is provided as input to IPSD Server  $S_b$  by way of the browser display screen. Then in response thereto, the Client System  $C_a$  requests the IPSD Server  $S_b$  to provide each registered UPSN<sub>i</sub> stored in the IPSI Registrant Database, and if so, then also its URL<sub>i</sub> to the Client System.

At Block B in FIG. 4B, the IPSD Server  $S_b$  analyses the IPSI Registrant Database shown in FIG. 2A1 to determine whether or not a symbolically linked UPSN<sub>i</sub> has been registered with a TM<sub>i</sub> (or SM<sub>i</sub>) and/or a company name CN<sub>i</sub> that have been provided as input to the IPSD Server  $S_b$  by way of the browser display screen. If so, then the IPSD Server sends to the Client System  $C_a$ , the URL<sub>i</sub> that is symbolically linked to the registered UPSN<sub>i</sub>. If not, then the IPSD records in the URL-request in the Non-IPSI Registrant Database shown in FIG. 2B for future registration-request operations related to the T/SM<sub>i</sub> sent by the Client System.

At Block C in FIG. 4B, the Client System  $C_a$  receives the URL<sub>i</sub> from the IPSD Server. Then, in response to a URL selection query based on the contents of the information subfields shown in FIG. 2A2 and displayed on the screen of the Client System  $C_a$ , the Client System requests the IPSI Server, identified by the user selected URL<sub>i</sub>, to provide the product or service information. Having accessed and displayed such product or service related information at the Client System, the user can review the information at the specified URL<sub>i</sub>, acquire knowledge about the product or service, and may, if the option is provided at the URL-specified Web-site, purchase the product or procure (i.e. contract for) the service by way of an on-screen electronic commercial transaction, as described hereinabove.

Referring to FIG. 5A, the high level structure is shown for a second, alternative type of communication protocol that may be used among the Client System  $C_a$ , the IPSD Server  $S_b$ , and the IPSI Server  $S_c$  of the IPSI finding system hereof when the GUI browser program on the Client System is in its IPSI Finder Mode of operation. FIG. 6A provides a high level flow chart illustrating the steps involved in carrying out this communication protocol when the Client System is in its IPSI Finder Mode of operation.

In order to enter the IPSI Finder mode of the system, the user selects the “IPSI Finder” button on the GUI-based browser display screen. Then at Block A of FIG. 6A, a UPSN is provided as input to IPSD Server  $S_b$ , and in response thereto the Client System  $C_a$  requests the IPSD Server  $S_b$  to provide each registered URL<sub>i</sub> stored in the IPSI Registrant Database.

At Block B in FIG. 6A, the IPSD Server  $S_b$  analyses the IPSI Registrant Database shown in FIG. 2A1 to determine whether or not a symbolically linked URL<sub>i</sub> has been registered with UPSN<sub>i</sub> that has been provided as input. If so, then in response to a URL selection query based on the contents of the information subfields shown in FIG. 2A2 and displayed on the screen of the Client System  $C_a$ , the IPSD Server  $S_b$  sends to the IPSI Server  $S_c$  hosting the user-

selected URL<sub>i</sub>, a request for the IPSI Server  $S_c$  to send product or service information at the selected URL<sub>i</sub> to the requesting Client System  $C_a$ . If the IPSD Server  $S_b$  determines that there does not exist a URL<sub>i</sub> in the IPSI Registrant Database symbolically linked with the UPSN<sub>i</sub> provided as input to the Client System  $C_a$ , then the IPSD Server  $S_b$  records the URL-request in the Non-IPSI Registrant Database for future registration operations with the company related to the input UPSN<sub>i</sub>.

At Block C in FIG. 6A, the IPSI Server  $S_c$  receives the user-selected URL<sub>i</sub> sent from the IPSD Server  $S_b$  and then provides to the Client System  $C_a$ , the product or service information located by the registered URL<sub>i</sub>. Having accessed and displayed such product or service related information at the Client System, the user can review the information at the selected URL<sub>i</sub>, acquire knowledge about the product or service, and may, if the option is provided at the URL-specified Web-site, purchase the product or service by way of an on-screen electronic commercial transaction.

Referring to FIG. 5B, the high level structure is shown for the second-type of communication protocol that can be used among the Client System  $C_a$ , the IPSD Server  $S_b$ , and the IPSI Server  $S_c$  of the IPSI finding system hereof when the GUI browser program on the Client System is in its UPSN Search Mode of operation. FIG. 6B provides a high level flow chart illustrating the steps involved in carrying out this communication protocol when the Client System is in its UPSN Search Mode of operation.

In order to enter the UPSN Search Mode of the system, the user selects the “UPSN Search” button on the GUI-based browser display screen. Then at Block A of FIG. 6B, a trademark  $TM_i$  (or servicemark  $SM_i$ ) and/or a company name  $CN_i$  is provided as input to IPSD Server  $S_b$  by way of a dialogue box displayed on the browser display screen. In response thereto, the Client System  $C_a$  requests the IPSD Server  $S_b$  to determine whether or not a registered UPSN<sub>i</sub> (and thus symbolically linked URL<sub>i</sub>) is stored in the IPSI Registrant Database. If so, then in response to a URL-selection query based on the content of the information subfields shown in FIG. 2A2 and displayed on the display screen of the Client System  $C_a$ , the IPSD Server  $S_b$  sends the IPSI Server  $S_c$  hosting the user-selected URI<sub>i</sub>, a request for the IPSI Server  $S_c$  to send product or service information at the selected URI<sub>i</sub> to the requesting Client System  $C_a$ . If the IPSD Server  $S_b$  determines that there is no registered UPSN<sub>i</sub> (and thus no symbolically linked URL<sub>i</sub>) stored in the IPSI Registrant Database, then the IPSD Server records the URL request in the Non-IPSI Registrant Database for future registration operations with the company related by the UPSN<sub>i</sub> sent by the Client System  $C_a$ .

At Block C in FIG. 6B, the IPSI Server hosting the user-selected URL<sub>i</sub> receives the request from the IPSD Server  $S_b$  and then provides the product or service information identified by the registered URL<sub>i</sub>. Having accessed and displayed such product or service related information at the Client System, the user can review the information at the specified URL<sub>i</sub>, acquire knowledge about the product or service, and may, if the option is provided at the URL-specified Web-site, purchase the product or service by way of an on-screen electronic commercial transaction.

The communication protocols described above can be realized using any suitable programming language including, for example, an object-oriented programming language such as the Java programming language. Registration Of Products And Services With The IPSI System

The utility of the product and service finding tool of the present invention depends in large part on the number of

products and services registered with the IPSI system. In principle, numerous techniques may be employed separately as in combination with each other in order to construct the IPSI and Non-IPSI Registrant Databases supported by the IPSD Servers of the present invention. Five such techniques will be detailed below.

According to a first database construction technique, product registration requests (PRRs) are sent out to each and every company (i.e. manufacturer) which has been issued a six digit UPC Manufacturer Identification Number (MIN) by the UCC, Inc. For the various products which such manufacturers sell, the product registration request should ascertain the various information elements identified in the IPSI Registrant Database of FIGS. 2A1 and 2A2 in order to construct the same.

According to a second database construction technique, a global advertising campaign is launched in order to solicit the various information elements identified in the IPSI Registrant Database of FIG. 2A1 and 2A2 thus register the products (and services) of companies and businesses participating in the program. Preferably, such information is collected by way of e-mail to facilitate database construction operations.

According to a third database construction technique, the IPSI system itself continuously solicits product registrations over time in order to collect information from companies responding favorably to the solicitations. Such solicitation efforts can involve the issuance of product registration requests.

According to a fourth database construction technique, a number of commercial Internet search engines, such as Altavista™, Yahoo™, WebCrawler™, Lycos™, Excite™, and powerful off-line parallel computing machines are enlisted to analyze (i.e. mine) information on the World Wide Web in order to collect and link the information elements specified in the IPSI Registrant Database of FIG. 2A1.

Once an "initial" IPSI Registrant Database has been constructed using any one or more of the four database construction techniques described hereinabove, companies registered therewith can be periodically contacted in order to update, expand or otherwise the accuracy of the information contained within the database of the IPSI system.

According to a fifth database and preferred construction technique of the present invention, the IPSI Database of the system is initially "seeded" with several items of information obtained and related without the assistance of such manufacturers. Such information items include: (1) the six digit UPC Manufacturer Identification Numbers used in the UPC symbols (i.e. numbers) applied to the products thereof; and (2) the URLs of the Web home pages of UCC-registered manufacturers.

The first step of this database construction method involves obtaining the six digit manufacturer codes issued to specific manufacturers (or vendors) by the Uniform Code Council, Inc. of Dayton, Ohio, or be obtained from various commercial sources including GE Information Services, QuickResponse Services, Inc. At present, about 95,000 manufacturers identification numbers have been issued to manufacturers by the UCC. A string of six zeros (i.e. 000000) may be added to each one of these 95,000 or so six digit Manufacturer Identification Number in order to produce 95,000 or so 12 digit numbers (i.e. hereinafter referred to as "Manufacturer's Reference Numbers") for the 95,000 or so manufacturers (i.e. Vendors) listed in the IPSI Registrant Database under construction. As each such Manufacturer Reference Number has the same length as a UPC number of

its manufacturer, this number can be stored in the UPSN Information Field of the Database along with the corresponding manufacturers name being stored in the Company Name Information Field.

The second step of the method involves finding the URL of the Web home page of each of the 95,000 manufacturers who have been assigned a Manufacturers Identification Code and are listed in the Database. Such URL information can be found using conventional off-line search engines that use the name and address of the manufacturer to find the URL of the home page of its Web-site, if it has one. Such URLs are then added to the Database, along with e-mail and/or other addresses of the manufacturer symbolically linked thereto.

Having constructed the "seeded" Database, it can then be used to connect the Client System of users to the home page of Web-sites of manufacturers of particular products. Initially, when an Internet user provides as input to the Client System operating in its UPSN Search Mode, either the first six or all 12 digits of a UPC number (associated with a particular product or service), the IPSD Server need only compare the input UPC number against the six digit Manufacturer Identification Number portion of the Manufacturers Reference Number listed in the "seeded" Database. The corresponding URL of the matching manufacturer is returned to the Client System C<sub>a</sub>. In instances of an initially seeded Database, wherein only the six digit Manufacturer Identification Numbers (or twelve digit Manufacturer Reference Numbers) are listed therein, the users are provided with the URLs of the home pages of the symbollically linked manufacturers (i.e. companies). Then, through mass mailings, advertisement and/or marketing and promotional efforts, the companies whose Manufacturer Identification Numbers (or Manufacturer Reference Numbers) are listed in the Database, as the case may be, are then contacted and requested to actively participate in linking the UPC numbers of their products with the URLs identifying whereon the Internet desired types of product-related information are located. When such URLs are registered within the Database, an inquiring Internet user knowing the corresponding UPC number can specify the exact location of a file containing information on the Web about any particular product (or service). Over time, the Manufacturer Reference Number of each manufacturer will become replaced by the UPC numbers and linked URLs on the WWW, and the users of the system can precisely pinpoint product-related information identified by the manufacturer, its marketing department and/or advertising agency. With manufacturer and advertiser participation and feedback, the initially seeded Database described hereinabove will gradually grow into a robust relational database richly filled with the various information items described in FIGS. 2A1 and 2A2, including the symbollically linked UPCs and URLs that point to very specific information files within IPSI Servers randomly located throughout the Internet.

#### Operation of the IPSI Finding System and Method

In each of the above-described embodiments of the system hereof shown in FIGS. 1A and 1B, the GUI-based Internet browser program of each Client System is provided with two independent modes of operation, namely: the "IPSI Finder Mode" and the "UPSN Search Mode".

When the "IPSI Finder" button is selected, the system (i.e. browser program) enters its the IPSI Finder Mode. Preferably, the user is provided with a choice of language (e.g. English, German, French, Japanese, Chinese, etc.) by way of an appropriate menu-selection screen. After the desired language selection is made, the home page is dis-

played upon the Client System's display screen. A typical display screen produced from the IPSD Server might read as follows:

Welcome to UPC-REQUEST™, the only Universal Product Information Finding System on the Internet.

Have you purchased a particular product, or are you considering the purchase of a particular product, on which you would like current, up-to-date information from the manufacturer or advertiser?

Look no further than the UPC-REQUEST™ Universal Product Information Finding System."

When the system is in this operational mode, as illustrated in FIGS. 3A, 4A and 5A, 6A, a Web-based information resource pertaining to any commercial product or service registered with the system can be displayed and selected by the user in order to automatically access the same from the Internet. Such information resources can include advertisements, specifications, operation descriptions, product simulations, purchase information, maintenance information, warranty and servicing information, product updates, distributor information, incentives (e.g. discounts, rebates, coupons, etc.), electronic data transaction screens, etc. In this mode, desired product or service information is obtained by simply manually entering the registered product's UPN (e.g. its UPC's 12 digit numerical string) or the registered service's USN (e.g. its UPC's 12 digit numerical string) into the dialogue box of the Internet browser or Internet application tool. When using the seeded IPSI Database described hereinabove, only the first six digits of the UPC number need be entered into the dialogue box. An exemplary display screen produced from the IPSD Server might be as follows:

"Simply enter the 12 digit UPC the particular product; click REQUEST, and then wait for the display of the list of Web locators (URLs) at which the desired product information can be found on the Internet."

Alternatively, a bar code symbol scanner can be used to enter the UPSN (e.g. UPC or USC number) into the system, thereby avoiding manual keyboard entry operations.

In response to such data entry operations, a list of URLs organized according to the information subfield classifications set forth in FIG. 2A2 are displayed on Client System C<sub>a</sub> making the request of the IPSD Server. At this stage, another display screen would appear with an exemplary message as follows:

"Please select the URL from the displayed URL list using the information subfield product information category displayed above. This will connect you to the product information related to the selected URL. You can return to the URL display list at anytime."

Upon selecting a particular URL from the displayed URL list, video and audio information content are automatically displayed on the Client System from the IPSI Server hosting the selected URL.

When the "UPSN Search" button is selected, the system enters its UPSN Search Mode". Preferably, the user is provided with a choice of language (e.g. English, German, French, Japanese, Chinese, etc.) by way of an appropriate menu-selection screen.

When the system is in this operational mode, as illustrated in FIGS. 3B, 4B and 5B, 6B, a predesignated information resource pertaining to any commercial product or service registered with the system can be automatically accessed from the Internet and displayed from the Internet browser of a Client System. Such information resources can include advertisements, specifications, operation descriptions, prod-

uct simulations, product upgrade information, purchase information, maintenance information, warranty and servicing information, etc. In this mode, desired product or service information is obtained by simply entering the registered product's trademark(s) or servicemark(s) and/or associated company name into the dialogue box of the Internet browser or Internet application tool. An exemplary display screen produced from the IPSD Server might be as follows:

"Simply enter the trademark used in connection with the particular product and/or the company name of the product's manufacturer; click REQUEST, and then wait for the display of a list of Web locators (URLs) at which desired types of product information can be found on the Internet."

10 In response to such data entry operations, a list of URLs organized according to the information subfield classifications set forth in FIG. 2A2 are displayed on Client System placing the request. Upon selecting a particular URL from the displayed list thereof, video and audio information content are automatically displayed on the Client System from the IPSI Server hosting the selected URL.

15 In an alternative embodiment of the present invention, the "IPSI Finder Mode" and the "UPSN Search Mode" can be integrated into a single server application so that there is no need or desire to manually select IPSI Finder and UPSN Search Mode buttons. In such an embodiment, the interaction between the IPSD Server and the requesting Client System can be designed to support the following Web server display screens and script underlying the same:

20 "Welcome to UPC-REQUEST™, the only Universal Product Information Finding System on the Internet.

25 Have you purchased a particular product, or considering the purchase of a particular product, on which you would like current, up-to-date information from the manufacturer or advertiser?

30 Look no further than the UPC-REQUEST™ Universal Product Information Finding System."

35 "Simply enter the 12 digit UPC number of the particular product, click REQUEST, and await from the list of Web locators (URLs) selected by the manufacturer at which the desired product information can be found?

40 "If you do not know the UPC number associated with the product you are looking for, then simply enter the trademark used in connection with the particular product and/or the company name of the manufacturer, Then click REQUEST, and wait for the display of the list of Web locators (URLs) at which the desired product information can be found?

45 "Please select the URL from the displayed URL list by clicking on it. This will connect you to the product information related to the selected URL. You can return to the URL display list at anytime."

50 Notably, such an integrated Web server application can be realized in a variety of ways. The exact words and graphics used to create an interactive script for an integrated Web server application will vary from embodiment to embodiment.

55 The Automated Registration Solicitation Mode Of The System

60 In the illustrative embodiments of the present invention, the data-synchronized IPSD Servers of the system hereof are also provided with an "Automated Registration Solicitation Mode" programmed by the webmaster (or administrator) of the IPSI Web-site. In this mode, each IPSD Server analyzes the data collected within its Non-IPSI Registrant Database. The data analysis determines: (1) which "unregistered"

products or services in the Non-IPSI Registrant Database were the subject of an information request at the IPSD Server; (2) how many hits (requests) were made for the product or service within a predetermined length of time (e.g. one week) by Internet users; and (3) whether the number of requests exceeds a particular "request threshold" (e.g. 100 requests in week period). Then, for each unregistered product (or service) which has exceeded the request threshold, the IPSD Server automatically sends an e-mail message to the associated company. Preferably, the e-mail message is designed to (i) inform the company of recent information requests for their products and/or services, and (ii) solicit the registration of such products and/or services with the IPSD Server. Once registered with the system, such products and services can be easily found on the Internet by anyone wishing to use the product and service finding techniques of the present invention.

The present invention has been described in great detail with reference to the above illustrative embodiments. It is understood, however, that numerous modifications will readily occur to those with ordinary skill in the art having had the benefit of reading the present disclosure.

For example, in the illustrative embodiments described hereinabove, separate databases are maintained by each data-synchronized IPSD Server for (i) registered products and services within the system, and (ii) non-registered products and services within the system. Notably, the reasons for using a dual database design of this sort would be based largely on economics, namely: only those companies who have paid the required maintenance (or registration) fees get their products (or services) and linked URLs "registered" with the system, whereas non-paying companies do not get their products (or services) and linked URLs registered with the system, regardless of how such product-URL or service-URL information is ascertained (e.g. by solicitation versus data mining).

Thus it is contemplated that in some embodiments of the present invention, each IPSD Server will be designed to maintain only a single database for maintaining product-URL and service-URL information currently available on the Internet. In such embodiments of the present invention, the concept of "non-registered" products and services will be avoided altogether, since the system implementation and administration (in all likelihood) will be designed to not require companies to pay maintenance (or registration) fees in order that their products (or services) and linked URLs are registered with the IPSI system. Instead, some alternative income producing scheme will be used in such embodiments of the present invention (e.g., advertisement space, user fees, subscription fees, Internet browser-licensing fees, etc.) for system maintenance and administration.

When practicing the system and method of the present invention, it is preferred that the UPC label (with its human-readable UPC number) assigned to the particular product be attached, embossed or otherwise embodied on an accessible surface thereof. In addition to applying the UPC label to the external packaging of the product, it is preferred that the UPC label also be printed on any and all product instructions and manuals provided with the product. In this way, the UPC number can be easily read by a human being and then used to access a desired type of product information using the system and method of the present invention.

In order that the system hereof can be used to find information pertaining to large products such as automobiles, motorcycles, skidoos, farm machinery, boats, etc., the present invention also contemplates assigning UPC numbers to such products and attaching, embossing or

otherwise embodying the same on an accessible surface thereof. Also, the UPC label should be printed on all instruction booklets and/or operating manuals normally provided with the product. In this way, information related to any particular product that is posted anywhere on the Internet and linked to URLs registered with the IPSD Servers of the system hereof can be readily found using the uniquely assigned UPC number assigned thereto by the manufacturer at the time of sale. Notably, multimedia information about such products can be most helpful in regard to the operation, repair and servicing of such products.

The system and method of the present invention has been shown to combine the use of UPC numbers, trademarks and company names when making a product information request of the system. It is understood, however, that the present invention can be practiced using any one of these items of information, alone or in combination with each other, in order to place a product (or service) information request with the system hereof.

These and all other such modifications and variations are deemed to be within the scope and spirit of the present invention as defined by the accompanying claims to Invention.

#### What is claimed is:

1. A system for finding and serving information pertaining to a particular consumer product and the manufacturer thereof on the Internet, said system comprising:

- (1) an Internet database serving subsystem operably connected to the infrastructure of the Internet and including
  - (1A) an information storage subsystem for storing first and second sets of information, said first set of information being representative of
    - (i) a plurality of manufacturer identification numbers (MINs) assigned to a plurality of manufacturers of consumer products, each said MIN being assigned to one of said plurality of manufacturers of consumer products, and
    - (ii) a plurality of home-page specifying URLs symbolically linked to said plurality of MINs, each said home-page specifying URL being symbolically linked to one of said plurality of manufacturers of consumer products and specifying the location of a manufacturer World Wide Web (WWW) site located on the Internet, having a home page on the WWW and being related to one of said plurality of manufacturers of consumer products, and
  - said second set of information being representative of
    - (i) a plurality of universal product numbers (UPN) assigned to a plurality of consumer products made by said plurality of manufacturers, each said UPN being assigned to one of said plurality of consumer products, and
    - (ii) a plurality of product-information specifying URLs symbolically linked to said plurality of UPNs, each said product-information specifying URL including one of said plurality of MINs, and being symbolically linked to one of said plurality of consumer products and specifying the location of an information resource located on the Internet related to at least one of said plurality of consumer products, and
- (1B) request servicing means for servicing a request for information about one of said plurality of products located on the Internet, made by a client subsystem operably connected to the Internet, wherein said request is transmitted to said Internet database serving subsystem for processing and includes information representative of the UPN assigned to said consumer

product on which product-related information located on the Internet is being sought by a consumer using said client subsystem,  
 wherein said request servicing means automatically compares the UPN included in said request against said plurality of MINs stored in said information storage subsystem, and  
 (i) automatically returns to said client subsystem, the home-page specifying URL symbolically linked to the MIN contained within the UPN included in said request if, at the time said request was made, no product-information specifying URLs have been symbolically linked to the UPN included in said request, within said information storage subsystem, and  
 (ii) automatically returns to said client subsystem, one or more of URLs symbolically linked to said UPN included in said request, if, at the time said request was made, one or more product-information specifying URLs have been symbolically linked to the UPN included in said request, within said information storage subsystem; and  
 (2) a plurality of product-information containing servers, each said product-information containing server being connected to the Internet and storing product-related information resources related to at least one of  
 (i) one or more of the WWW sites of said plurality of manufacturers of consumer products, and  
 (ii) one or more of said plurality of consumer products, wherein the location of each said product-related information resource on the Internet is specified by one said plurality of product-information specifying URLs, and  
 wherein the location of the home page of each said WWW site is specified by one of said plurality of home-page specifying URLs, and  
 wherein said client subsystem can use  
 (i) the one or more product-information specifying URLs returned by said request servicing means to access product-related information from said one or more of said plurality of product-related information containing servers, and  
 (ii) the home-page specifying URL returned from said request servicing means to access the home-page of the manufacturer's WWW site from one or more of said plurality of product-related information containing servers.

2. The system according to claim 1, wherein said one or more URLs are arranged for display on said client subsystem in accordance with a predetermined product-related information classification scheme.

3. The system according to claim 1, wherein one or more of said product-related information resources comprise HTML-encoded documents located on the WWW.

4. The system according to claim 3, wherein one or more of said product-information specifying URLs specify the location of said HTML-encoded documents located on the WWW.

5. The system according to claim 1, wherein said client subsystem is a WWW-enabled computer system selected from the group consisting of: a computer-based kiosk provided with a first WWW browser and a first bar code symbol reading device operably connected to said first WWW browser; a portable computer provided with a second WWW browser and a second bar code symbol reading device operably connected to said second WWW browser; and a desktop computer system provided with a third WWW

browser and a third bar code symbol reading device operably connected to said third WWW browser.

6. The system according to claim 1, wherein said UPN is a UPC.

7. The system of claim 1, wherein said Internet database serving subsystem comprises an Internet information server and a relational database subsystem operably connected to said Internet database serving subsystem.

8. A method of finding and serving information pertaining to a particular consumer product and the manufacturer thereof on the Internet, said method comprising the steps of:

(a) storing first and second sets of information in an Internet database serving subsystem operably connected to the infrastructure of the Internet,  
 said first set of information being representative of  
 (i) a plurality of manufacturer identification numbers (MINs) assigned to a plurality of manufacturers of consumer products, each said MIN being assigned to one of said plurality of manufacturers of consumer products, and  
 (ii) a plurality of home-page specifying URLs symbolically linked to said plurality of MINs, each said home-page specifying URL being symbolically linked to one of said plurality of manufacturers of consumer products and specifying the location of a manufacturer World Wide Web (WWW) site located on the Internet, having a home page on the WWW and being related to one of said plurality of manufacturers of consumer products, and

said second set of information being representative of  
 (i) a plurality of universal product numbers (UPN) assigned to a plurality of consumer products made by said plurality of manufacturers, each said UPN being assigned to one of said plurality of consumer products, and

(ii) a plurality of product-information specifying URLs symbolically linked to said plurality of UPNs, each said product-information specifying URL including one of said plurality of MINs, and being symbolically linked to one of said plurality of consumer products, and specifying the location of an information resource located on the Internet related to at least one of said plurality of consumer products; and

(b) transmitting to said Internet database serving subsystem, a request made by a client subsystem operably connected to the Internet, for product-related information on the Internet about one of said plurality of consumer products, said request including information representative of the UPN assigned to a particular consumer product on which product-related information located on the Internet is being sought by a consumer using said client subsystem,

(c) said Internet database serving subsystem receiving said request and automatically comparing the UPN included in said request against said plurality of MINs stored in said information storage subsystem, and

(i) automatically returning to said client subsystem, the home-page specifying URL symbolically linked to the MIN contained within the UPN included in said request, if, at the time said request is made, no product-information specifying URLs have been symbolically linked to the UPN included in said request, within said information storage subsystem, and

(ii) automatically returning to said client subsystem, one or more of URLs symbolically linked to said

UPN included in said request, if, at the time said request is made, one or more product-information specifying URLs have been symbolically linked to the UPN included in said request, within said information storage subsystem; and

- (d) said client subsystem using one or more URLs returned during step (c) to access product-related information resources and the home-page of manufacturer WWW sites from one or more product-related information containing servers, wherein each said product-related information containing server is connected to the Internet and stores product-related information resources related to at least one of
  - (i) one or more of the WWW sites of said manufacturers of consumer products, and
  - (ii) one or more of said plurality of consumer products, wherein the location of each said consumer product-related information resource on the Internet is specified by one said product-information specifying URL, and
 wherein the location of the home-page of each said WWW site is specified by one of said plurality of home-page specifying URLs.

9. The method according to claim 8, wherein said one or more product-information specifying URLs are arranged for display on said client subsystem in accordance with a predetermined product-related information classification scheme.

10. The method according to claim 8, wherein one or more of said product-related information resources comprise HTML-encoded documents on the WWW, and wherein one or more of said product-information specifying URLs specify the location of said HTML-encoded documents.

11. The method according to claim 8, wherein said client subsystem is a WWW-enabled computer system selected from the group consisting of: a computer-based kiosk provided with a first WWW browser and a first bar code symbol reading device operably connected to said first WWW browser; a portable computer provided with a second WWW browser and a second bar code symbol reading device operably connected to said second WWW browser; and a desktop computer system provided with a third WWW browser and a third bar code symbol reading device operably connected to said third WWW browser.

12. The method according to claim 8, wherein said UPN is a UPC.

13. The method of claim 8, wherein said Internet database serving subsystem comprises an Internet information server and a relational database subsystem operably connected to said Internet information server.

14. A system for finding and serving the home-page of a World Wide Web (WWW) site of a manufacturer of a particular consumer product, said system comprising:

- (1) an Internet database serving subsystem operably connected to the infrastructure of the Internet and including
  - (1A) an information storage subsystem for storing a set of information being representative of
    - (i) a plurality of manufacturer identification numbers (MINs) assigned to a plurality of manufacturers of consumer products, each said MIN being assigned to one of said plurality of manufacturers of consumer products, and
    - (ii) a plurality of home-page specifying URLs symbolically linked to said plurality of MINs, each said home-page specifying URL being symbolically linked to one of said plurality of manufacturers of consumer products and specifying the location of a

manufacturer WWW site located on the Internet, having a home page on the WWW and being related to one of said plurality of manufacturers of consumer products, and

- 5 (1B) request servicing means for servicing a request made by a client subsystem operably connected to the Internet, wherein said request is transmitted to said Internet database serving subsystem for processing and includes information representative of the UPN assigned to said consumer product on which product-related information located on the Internet is being sought by a consumer using said client subsystem, wherein said request servicing means automatically compares the UPN included in said request against said plurality of MINs stored in said information storage subsystem, and automatically returns to said client subsystem, the home-page specifying URL symbolically linked to the MIN contained within the UPN included in said request;
- 10 (2) a plurality of product-information containing servers, each said product-information containing server being connected to the Internet and storing information resources including the home-page of at least one or more of the WWW sites of said plurality of manufacturers of consumer products, wherein the location of the home-page of each said WWW site is specified by one of said plurality of home-page specifying URLs, and
- 15 wherein said client subsystem can use the home-page specifying URL returned by said request servicing means to access from at least one of said product-information containing servers, the home-page of the WWW site of the manufacturer symbolically linked to said MIN contained within the UPN included in said request.

20 15. The system according to claim 14, wherein said home-page specifying URL returned by said request servicing means is automatically displayed on said client subsystem for accessing the home-page of the WWW site of the manufacturer symbolically linked to said MIN contained within the UPN included in said request.

25 16. The system according to claim 14, wherein one or more of said product-related information resources comprise HTML-encoded documents located on the WWW.

30 17. The system according to claim 16, wherein one or more of said product-information specifying URLs specify the location of said HTML-encoded documents on the WWW.

35 18. The system according to claim 14, wherein said client subsystem is a WWW-enabled computer system selected from the group consisting of: a computer-based kiosk provided with a first WWW browser and a first bar code symbol reading device operably connected to said first WWW browser; a portable computer provided with a second WWW browser and a second bar code symbol reading device operably connected to said second WWW browser; and a desktop computer system provided with a third WWW browser and a third bar code symbol reading device operably connected to said third WWW browser.

40 19. The system according to claim 14, wherein said UPN is a UPC.

45 20. The system of claim 14, wherein said Internet database serving subsystem comprises an Internet information server and a relational database subsystem operably connected to said Internet database serving subsystem.

50 21. A method of finding and serving the home-page of the World Wide Web (WWW) site of a manufacturer of a particular consumer product, said method comprising the steps of:

- (a) storing a set of information in an Internet database serving subsystem operably connected to the infrastructure of the Internet,  
 said set of information being representative of  
 (i) a plurality of manufacturer identification numbers (MINs) assigned to a plurality of manufacturers of consumer products, each said MIN being assigned to one of said plurality of manufacturers of consumer products, and  
 (ii) a plurality of home-page specifying URLs symbolically linked to said plurality of MINs, each said home-page specifying URL being symbolically linked to one of said plurality of manufacturers of consumer products and specifying the location of a manufacturer World Wide Web (WWW) site located on the Internet, having a home page, and being related to one of said plurality of manufacturers of consumer products;  
 (b) transmitting to said Internet database serving subsystem, a request made by a client subsystem operably connected to the Internet, for product-related information on the Internet about one of said plurality of consumer products, said request including information representative of the UPN assigned to a particular consumer product on which product-related information located on the Internet is being sought by a consumer using said client subsystem;  
 (c) said Internet database serving subsystem receiving said request and automatically comparing the UPN included in said request against said plurality of MINs stored in said information storage subsystem, and automatically returning to said client subsystem, the home-page specifying URL symbolically linked to the MIN contained within the UPN included in said request; and

- 5 (d) said client subsystem using the home-page specifying URL returned during step (c) to access the home-page of the WWW site of the manufacturer symbolically linked to the MIN contained within the UPN included in said request.  
 10 22. The method according to claim 21, wherein said home-page specifying URL returned during step (c) is automatically displayed on said client subsystem for accessing the home-page of the WWW site of the manufacturer symbolically linked to said MIN contained within the UPN included in said request.  
 15 23. The method according to claim 21, wherein one or more of the home-pages of said WWW sites comprise HTML-encoded documents located on the WWW.  
 20 24. The method according to claim 23, wherein one or more of said home-page specifying URLs specify the location of said HTML-encoded documents on the WWW.  
 25 25. The method according to claim 21, wherein said client subsystem is a WWW-enabled computer system selected from the group consisting of: a computer-based kiosk provided with a first WWW browser and a first bar code symbol reading device operably connected to said first WWW browser; a portable computer provided with a second WWW browser and a second bar code symbol reading device operably connected to said second WWW browser; and a desktop computer system provided with a third WWW browser and a third bar code symbol reading device operably connected to said third WWW browser.  
 30 26. The method according to claim 21, wherein said UPN is a UPC.  
 27. The method of claim 21, wherein said Internet database serving subsystem comprises an Internet information server and a relational database subsystem operably connected to said Internet database serving subsystem.

\* \* \* \* \*



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(12) **United States Patent**  
Brook et al.

(10) Patent No.: **US 6,170,746 B1**  
(45) Date of Patent: **Jan. 9, 2001**

(54) **SYSTEM AND METHOD FOR TRACKING DRUGS IN A HOSPITAL**(75) Inventors: **Douglas J. Brook; Mark S. Morrow**, both of Dayton; **Raymond D. Tavener**, Lebanon, all of OH (US)(73) Assignee: **Monarch Marking Systems, Inc.**, Dayton, OH (US)

(\*) Notice: Under 35 U.S.C. 154(b), the term of this patent shall be extended for 0 days.

(21) Appl. No.: **09/133,762**(22) Filed: **Aug. 12, 1998**(51) Int. Cl.<sup>7</sup> ..... **G06F 17/60**(52) U.S. Cl. ..... **235/385; 235/462.01**

(58) Field of Search ..... 235/380, 382, 235/383, 385, 375, 462.15, 462.01, 462.45; 705/2, 3, 22, 28

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Primary Examiner—Thien M. Le

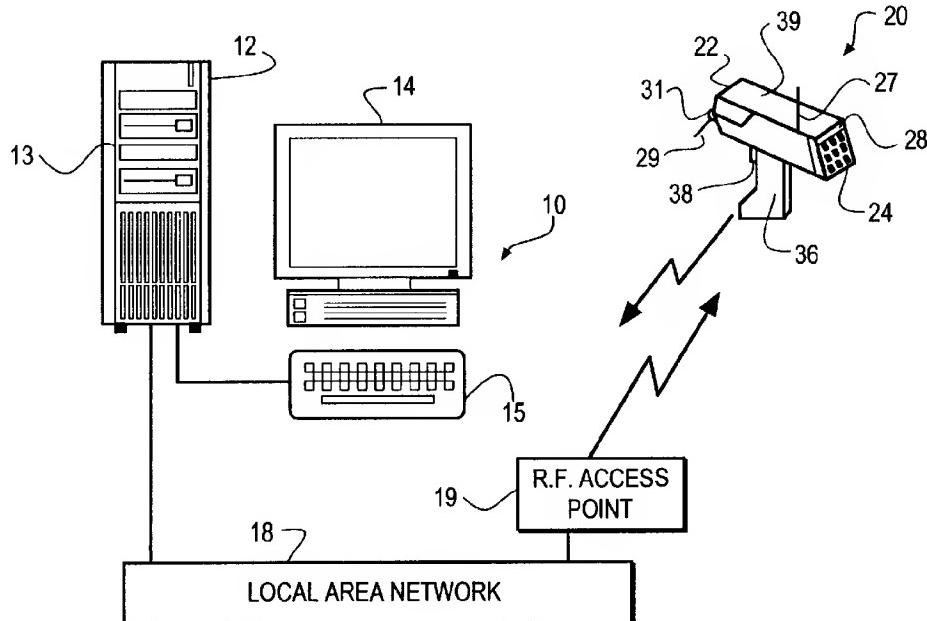
Assistant Examiner—Larry D. Taylor

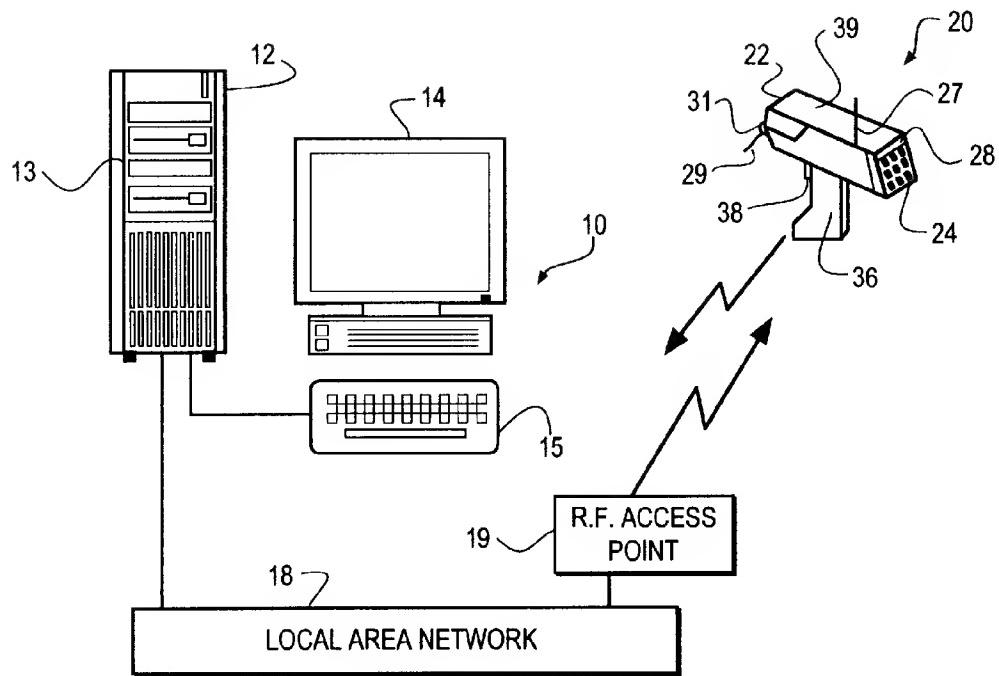
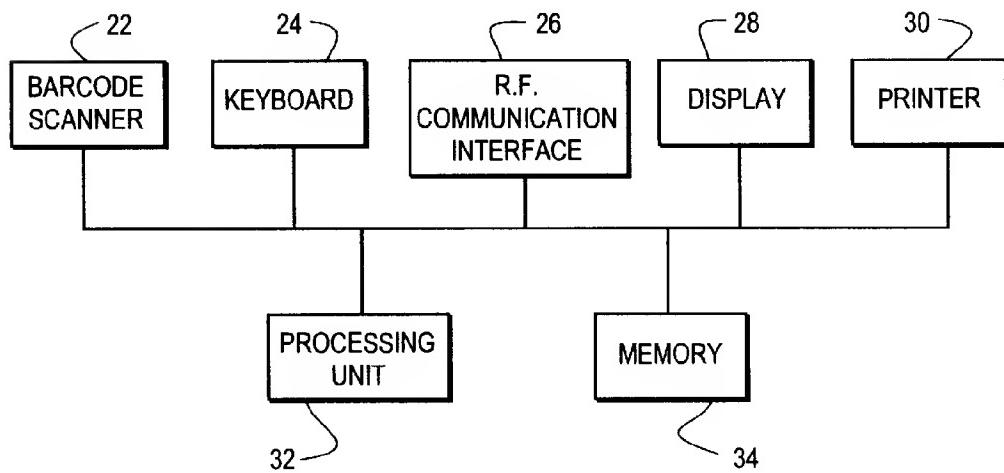
(74) Attorney, Agent, or Firm—McAndrews, Held &amp; Malloy, Ltd.

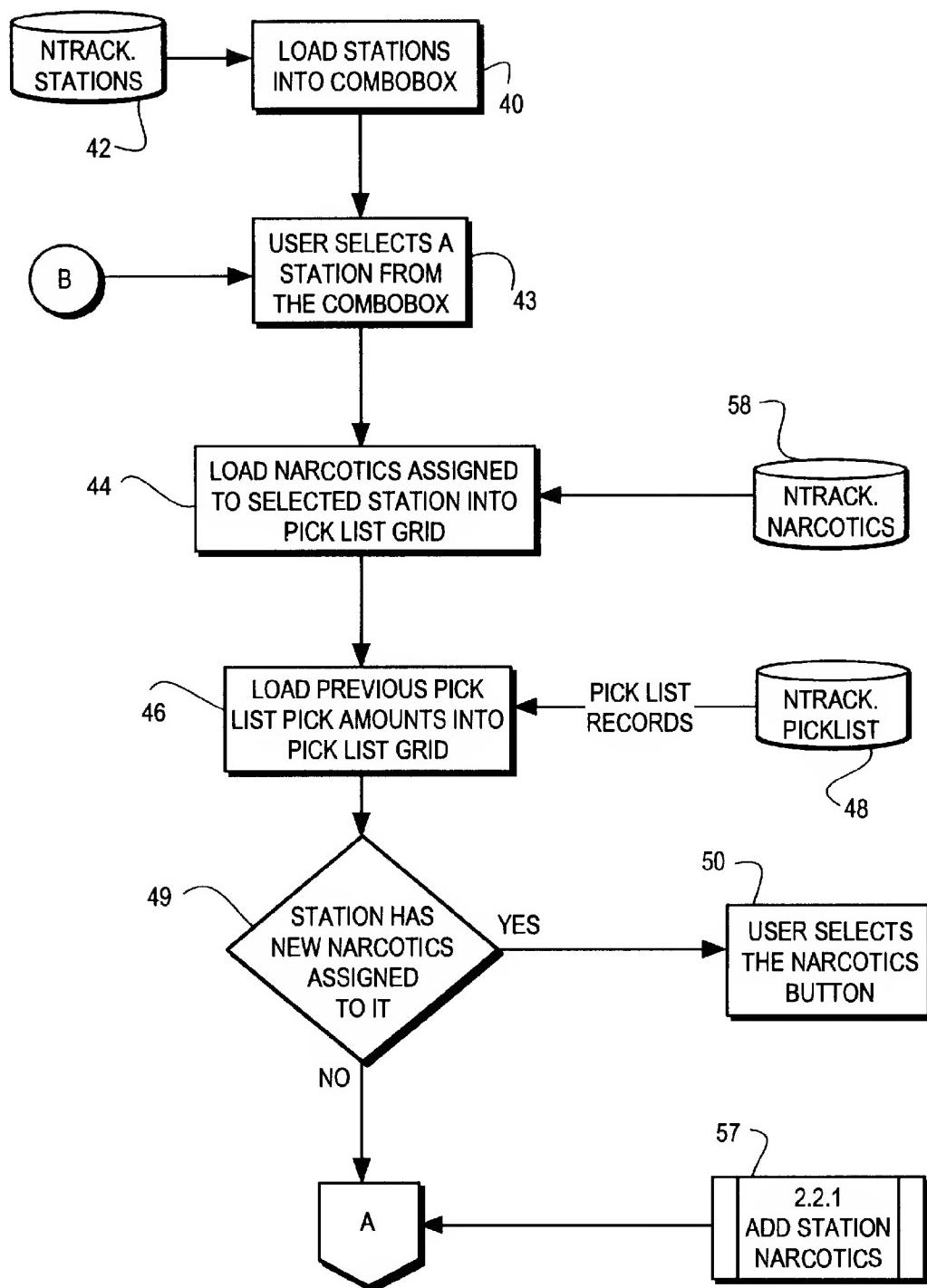
(57) **ABSTRACT**

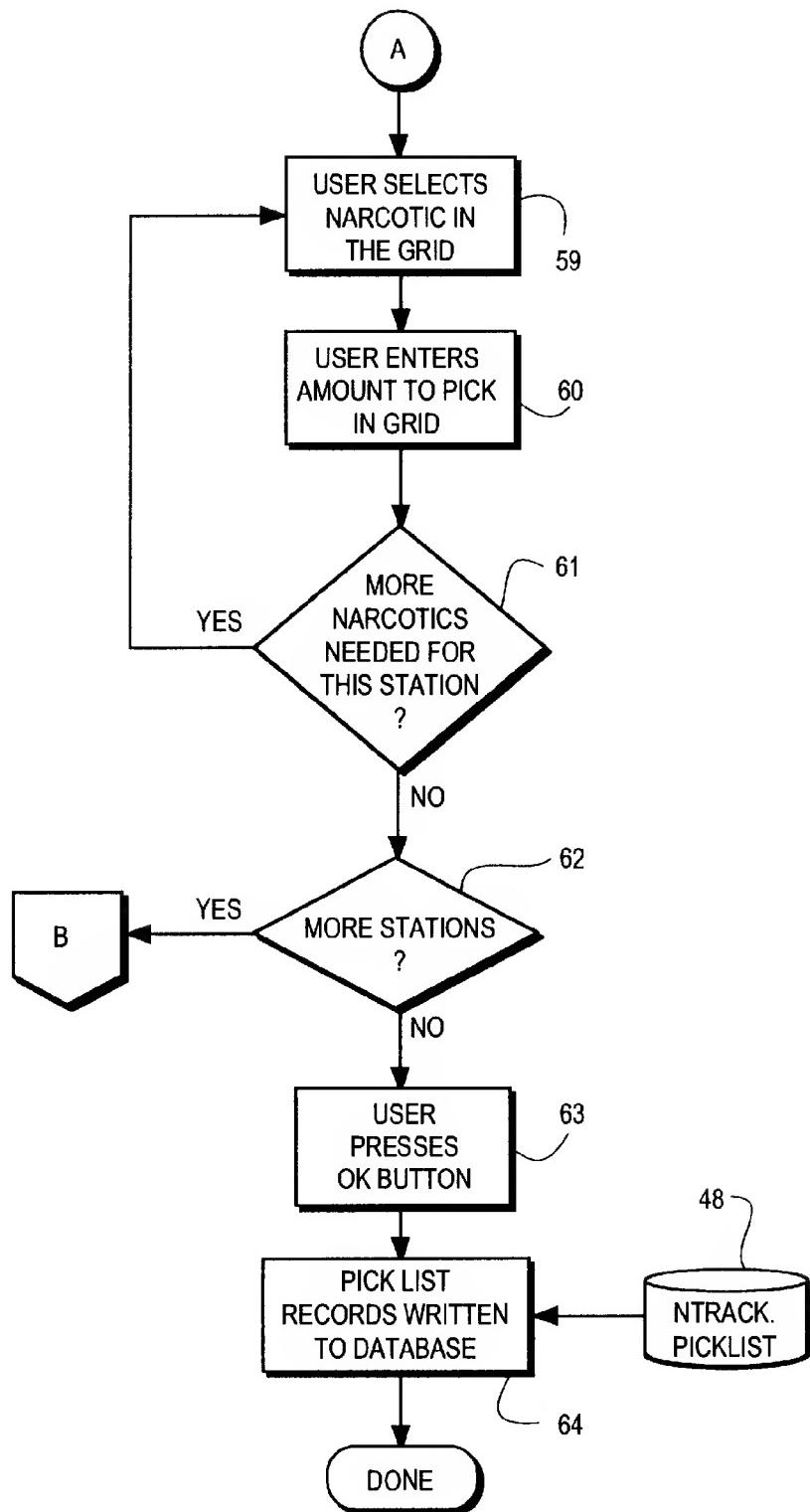
A drug tracking system and method for use in hospitals, pharmacies, etc. uses a portable barcode scanning and printing system to reduce errors in the tracking information and to facilitate the ease and efficiency of the drug tracking operation. The portable scanning and printing system automatically prompts the user to enter data necessary for tracking one or more drugs. The portable scanning and printing system also prompts the user to select a particular drug and/or quantity. Automatic verification of the user entered data is performed by the portable system so as to warn the user via a displayed message that the wrong drug and/or quantity was selected or to prompt the user to recount and/or re-enter data so that any discrepancies can be immediately corrected. The portable scanning and printing system also prints alpha-numeric and barcode information on labels that are used to continue the drug tracking operation at other locations. Because the portable scanning and printing system is mobile, all of the drug tracking operations can be performed at the drug's situs to improve the accuracy of the drug tracking operation.

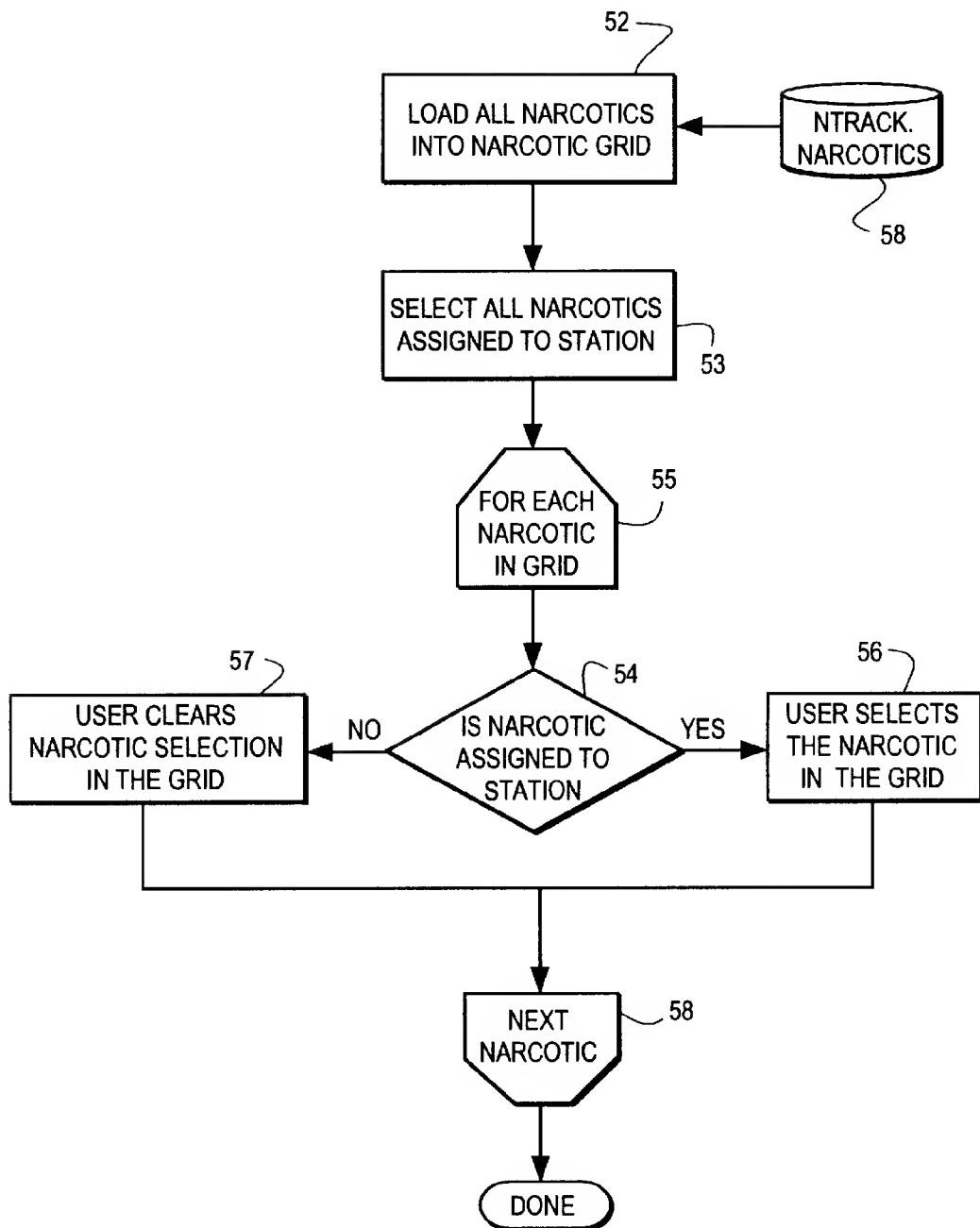
43 Claims, 27 Drawing Sheets

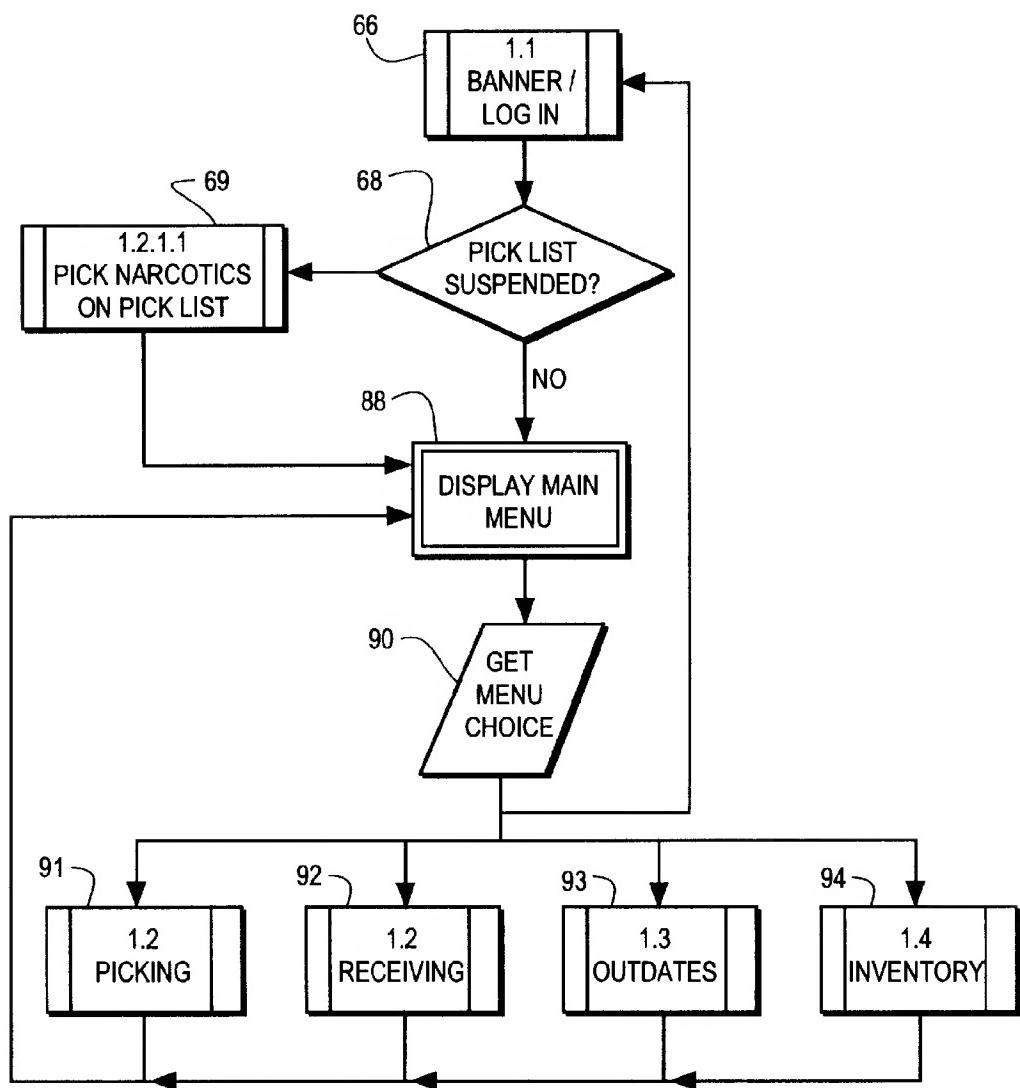


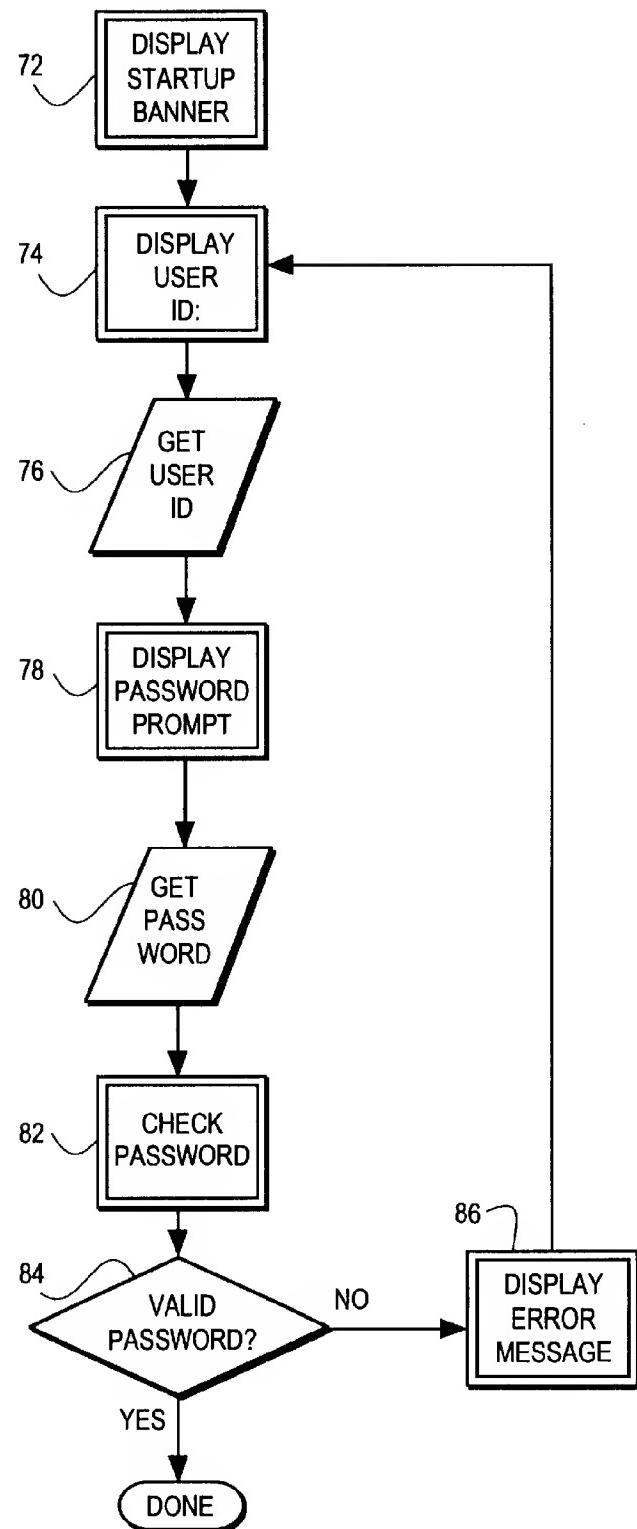
**FIG. 1****FIG. 2**

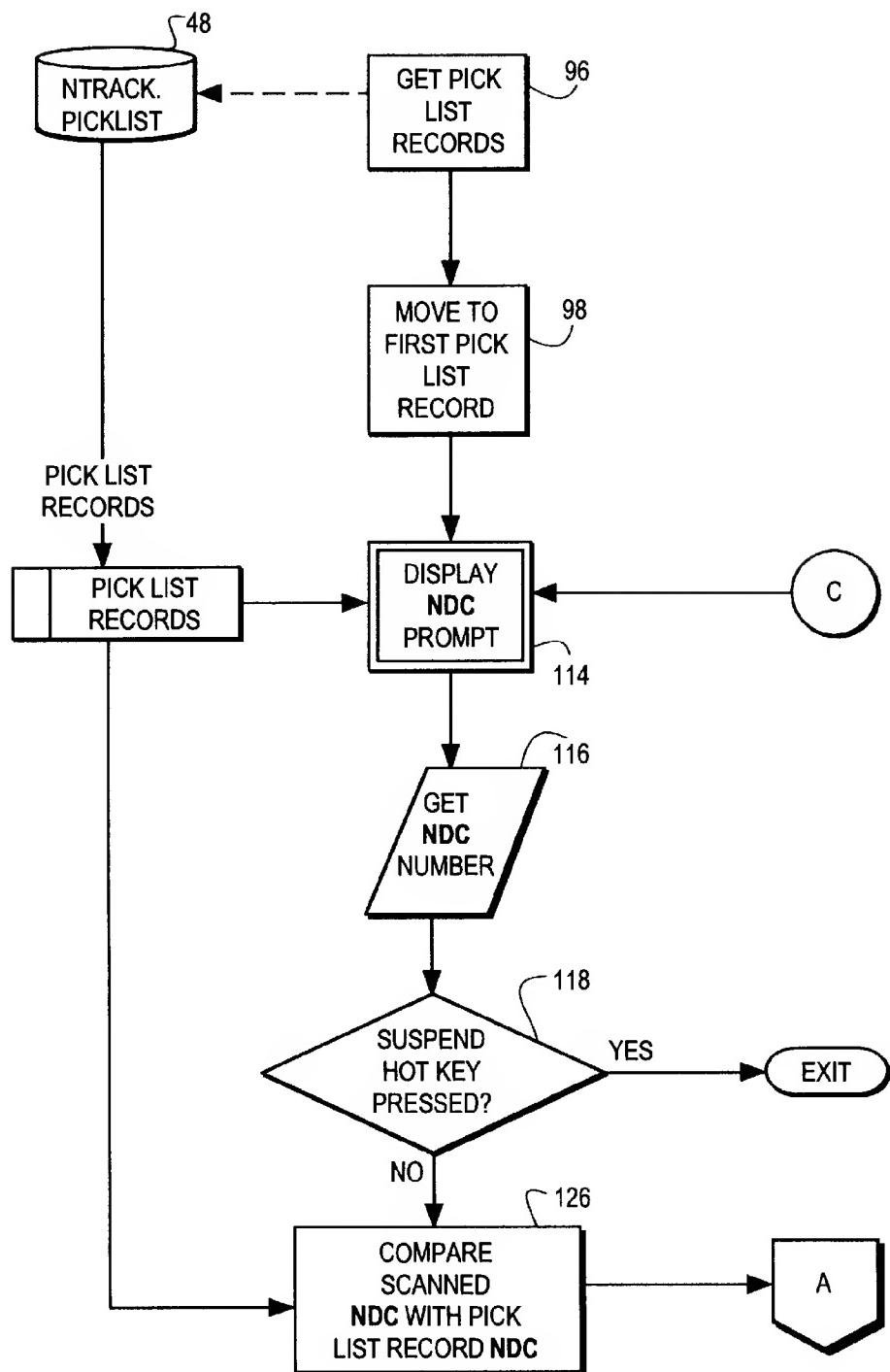
**FIG. 3A**

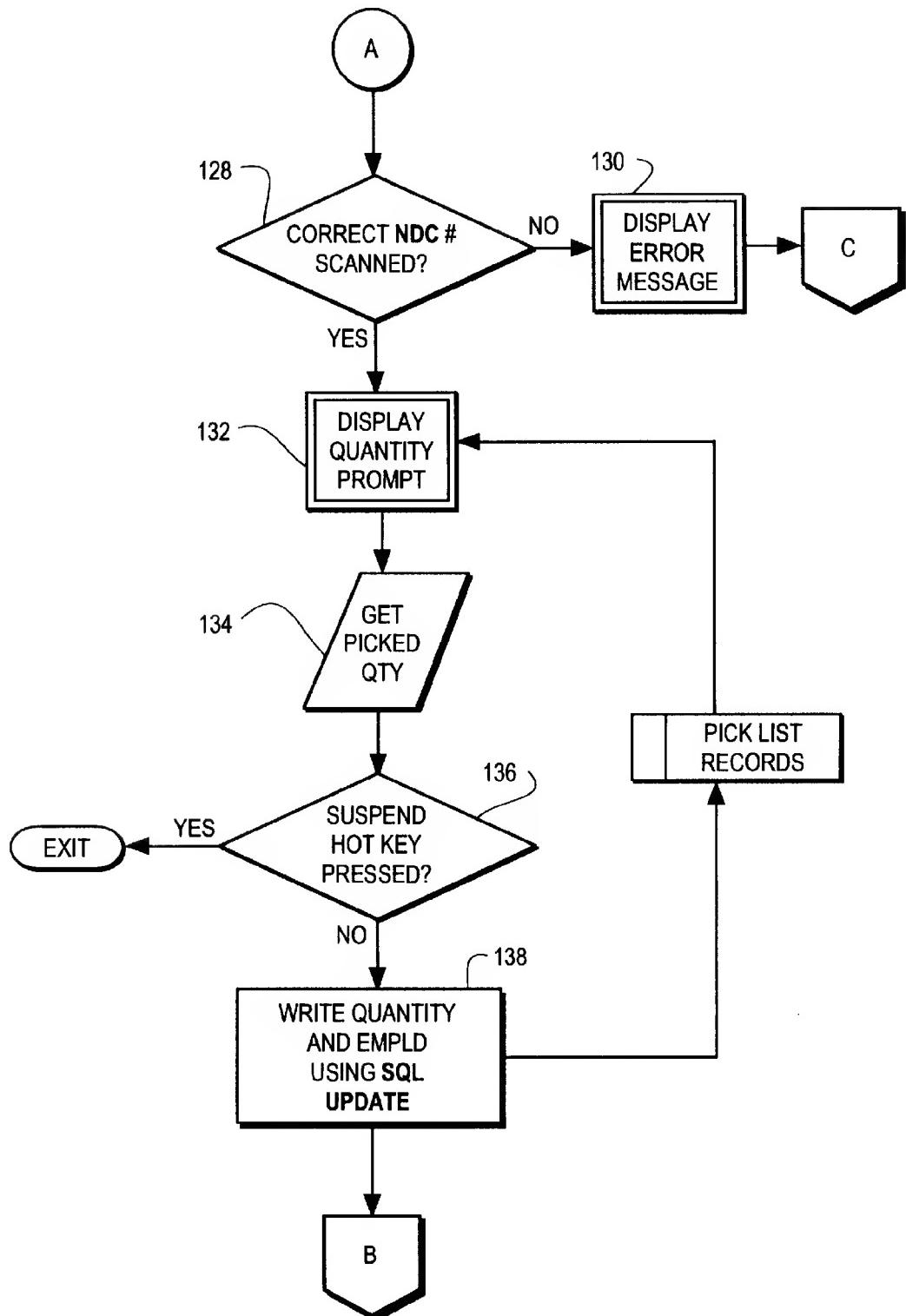
**FIG. 3B**

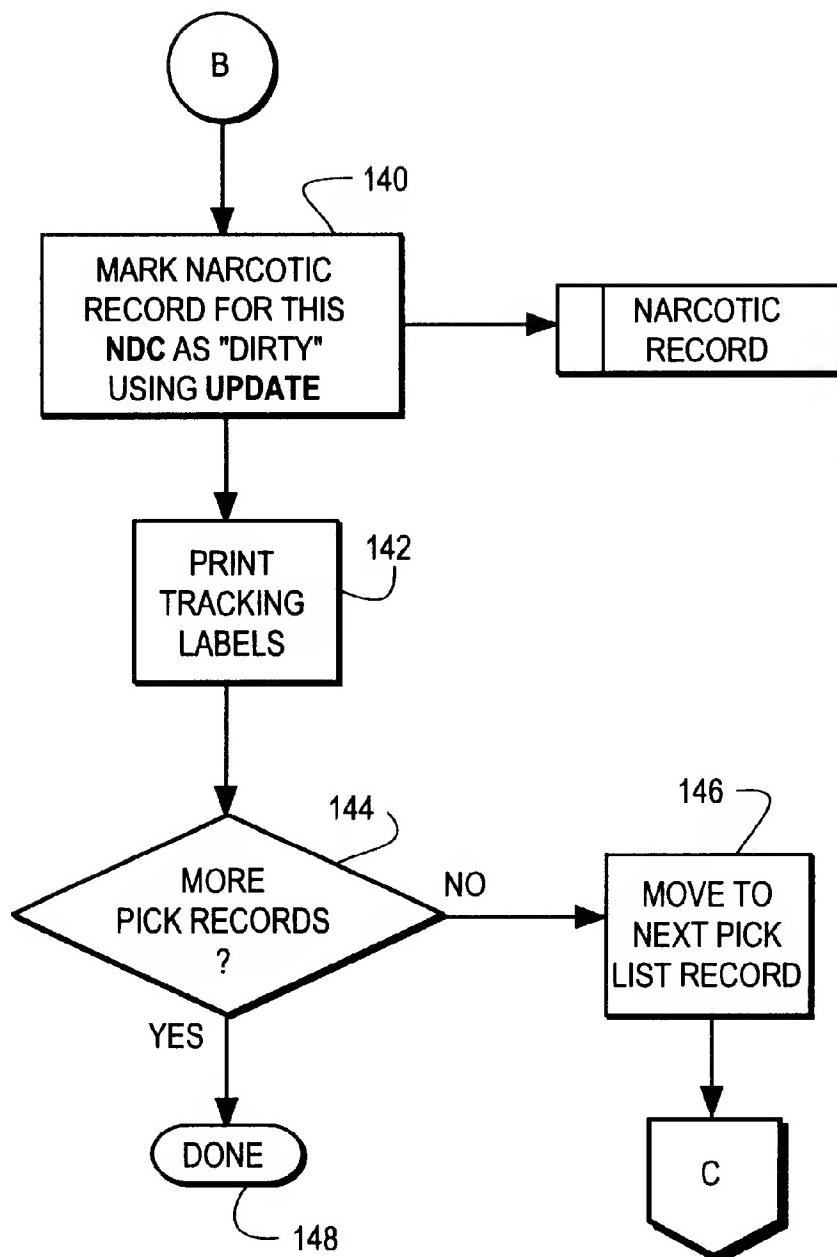
**FIG. 3C**

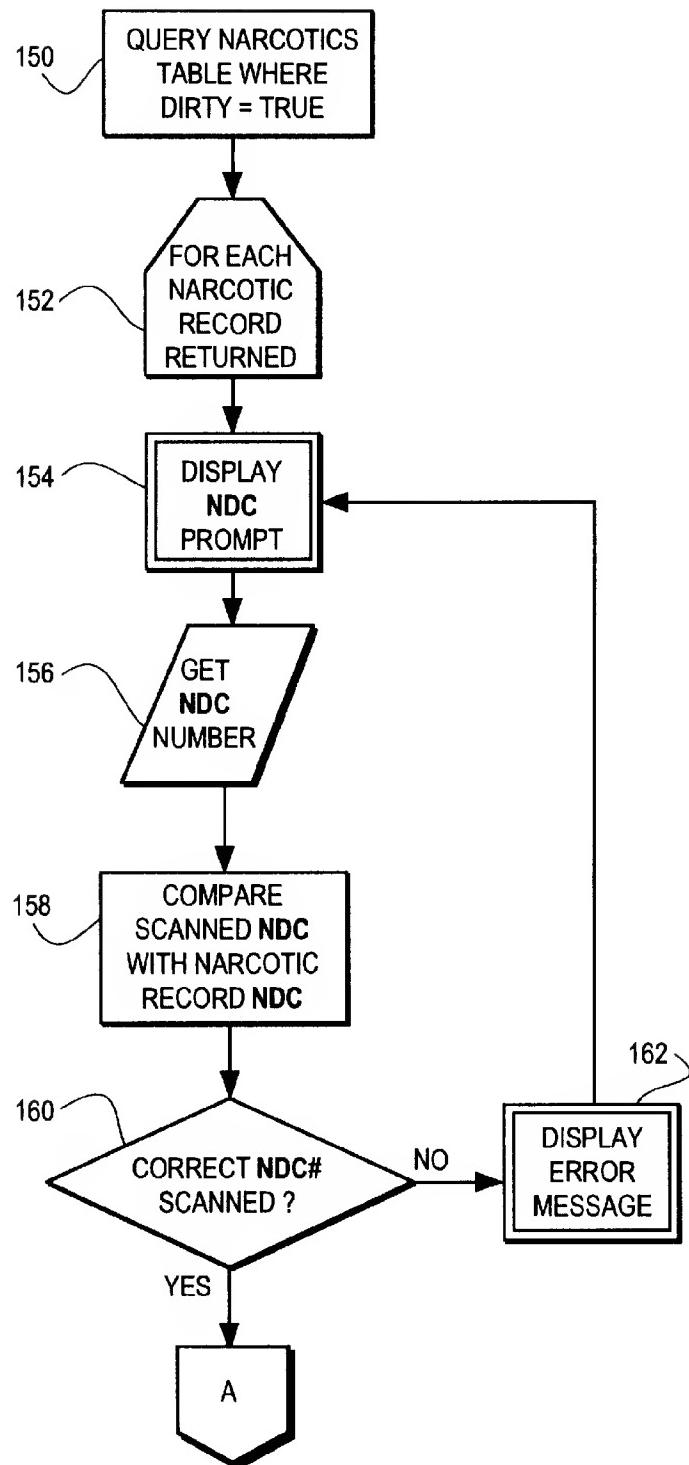
**FIG. 4**

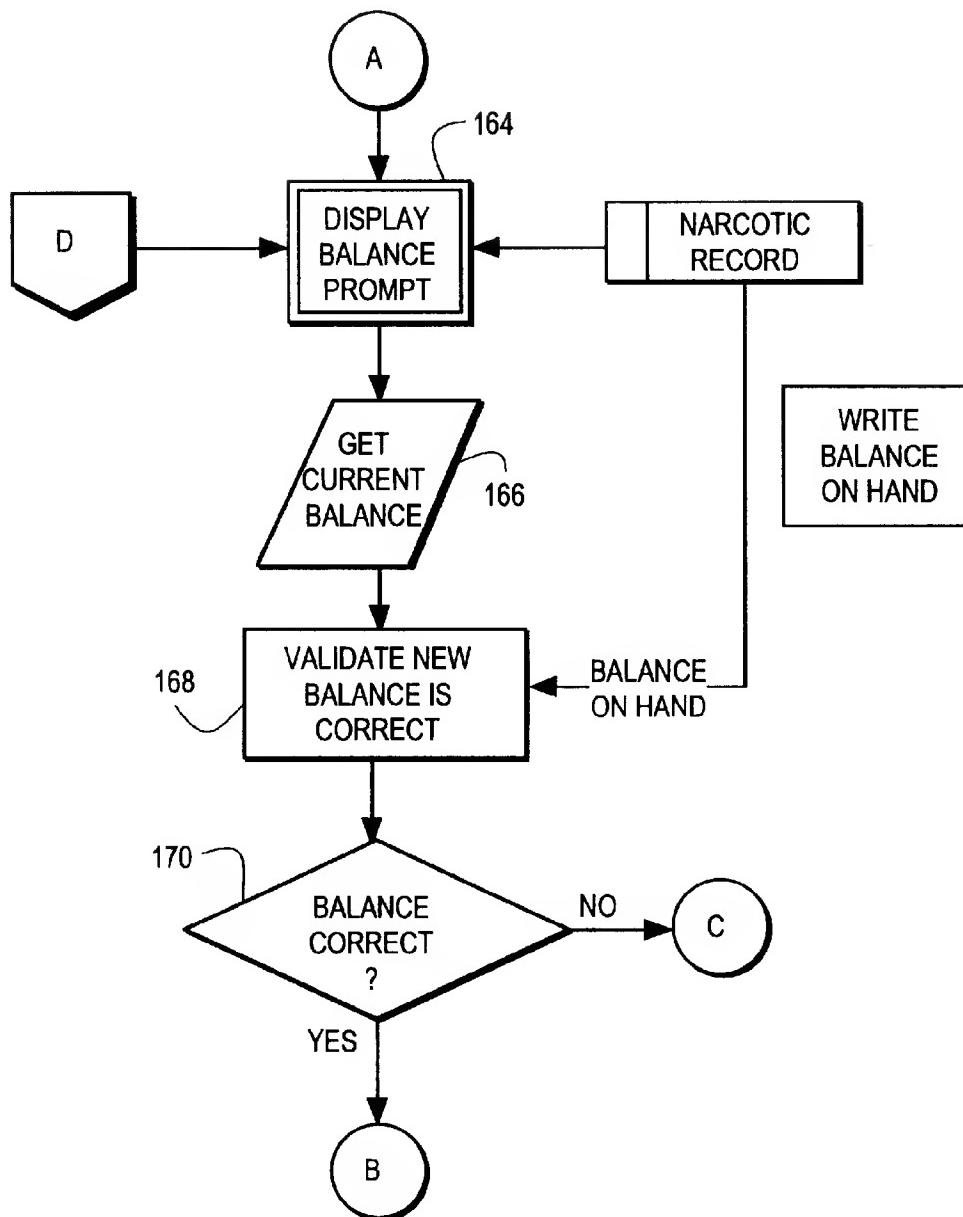
**FIG. 5**

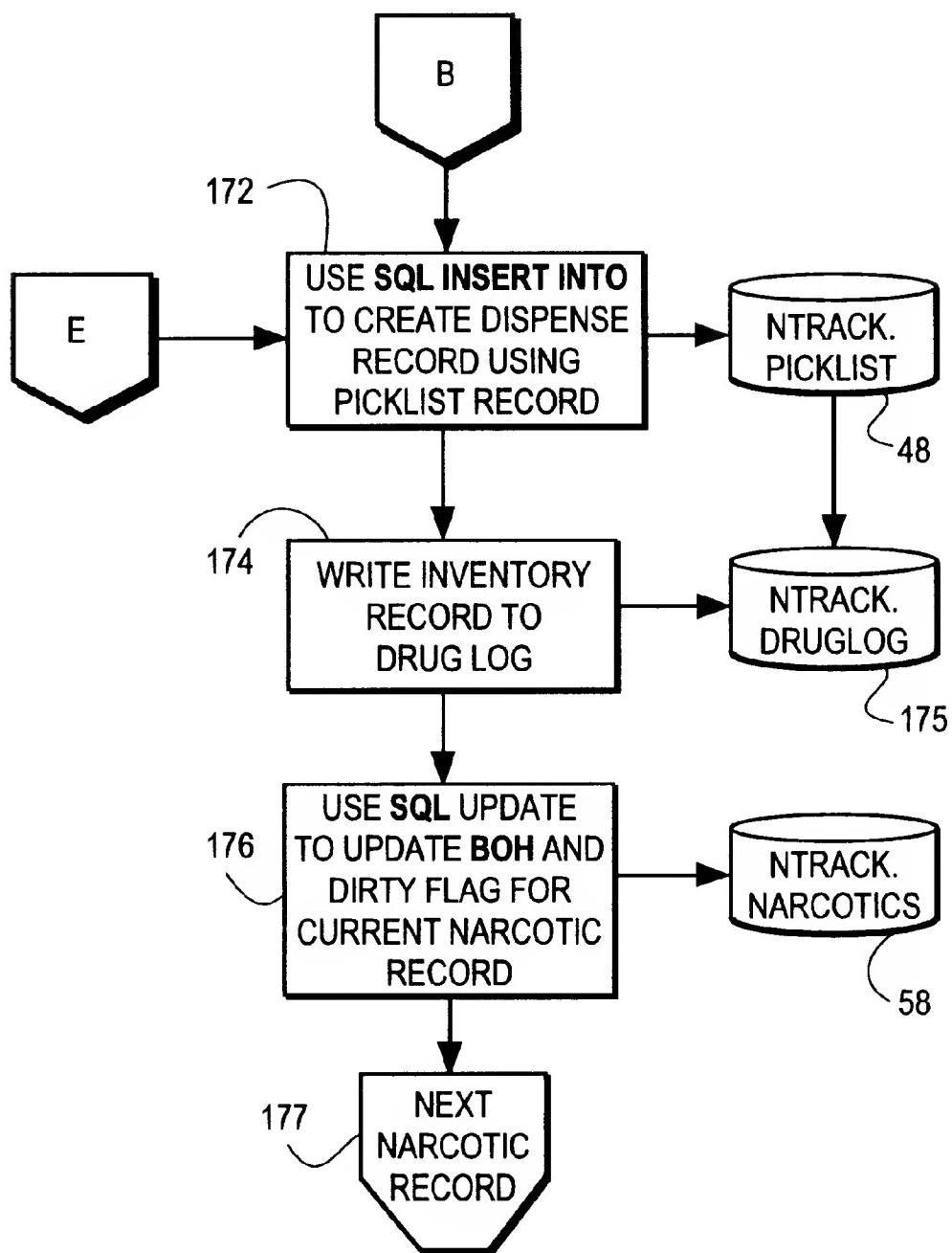
**FIG. 6A**

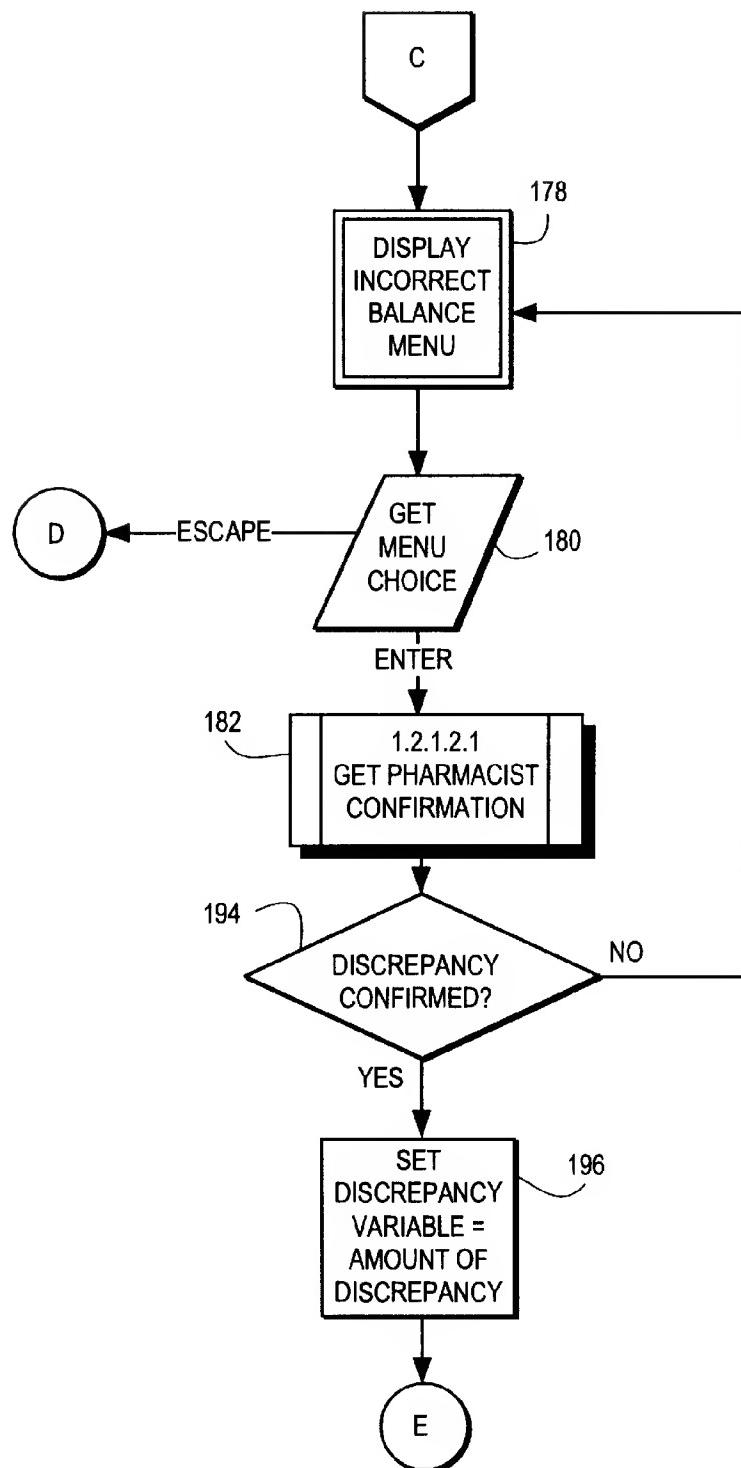
**FIG. 6B**

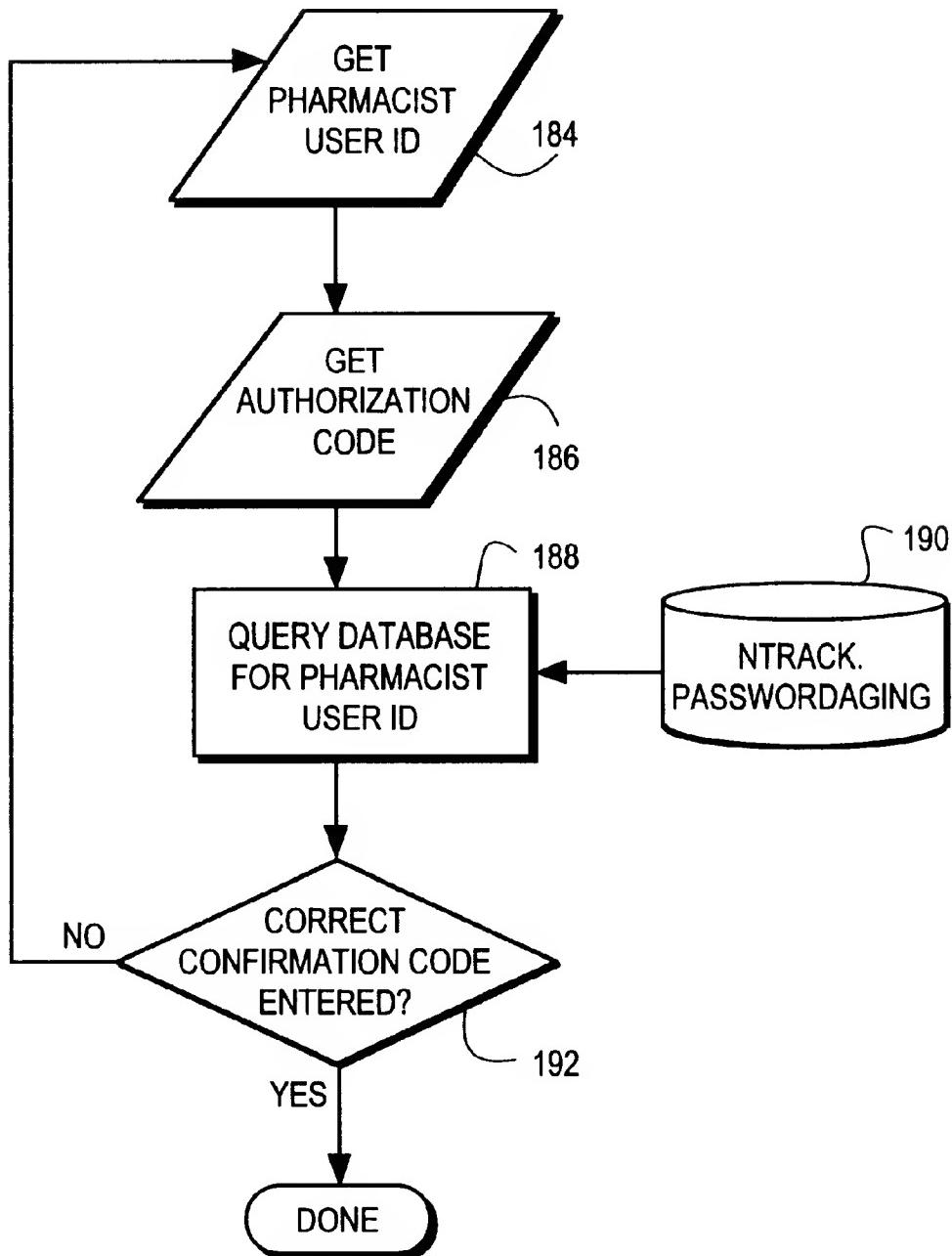
**FIG. 6C**

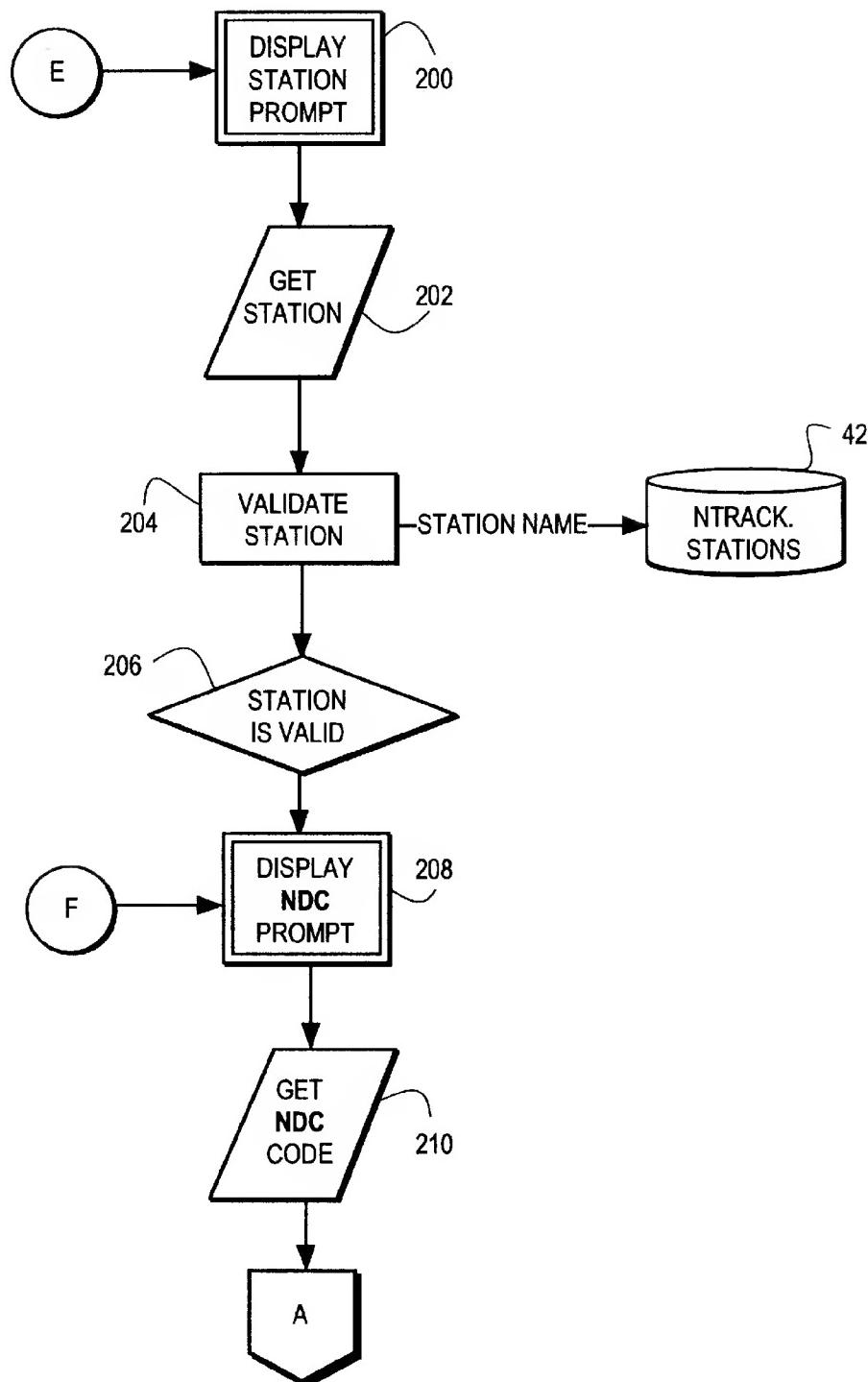
**FIG. 7A**

**FIG. 7B**

**FIG. 7C**

**FIG. 7D**

**FIG. 8**

**FIG. 9A**

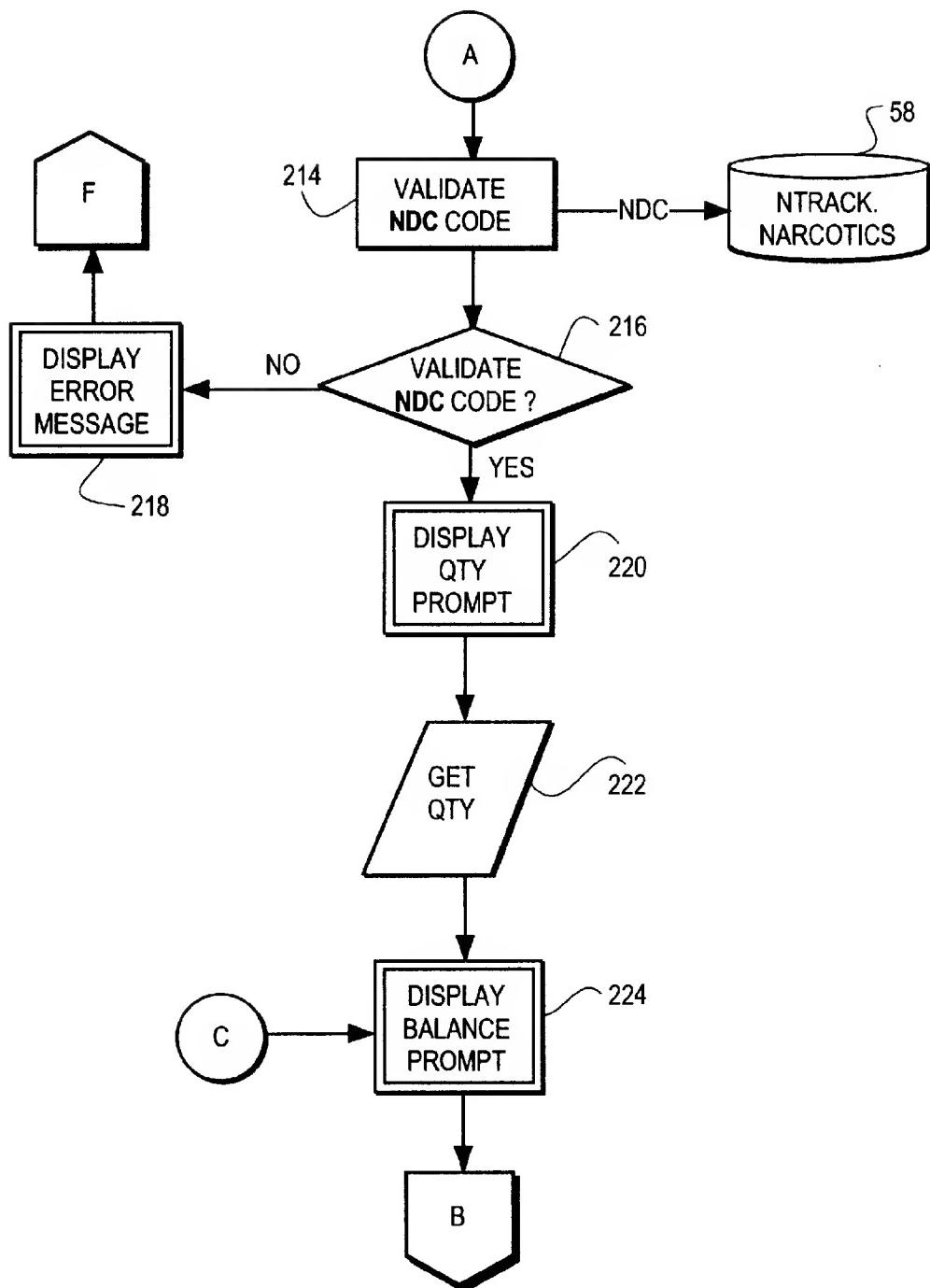
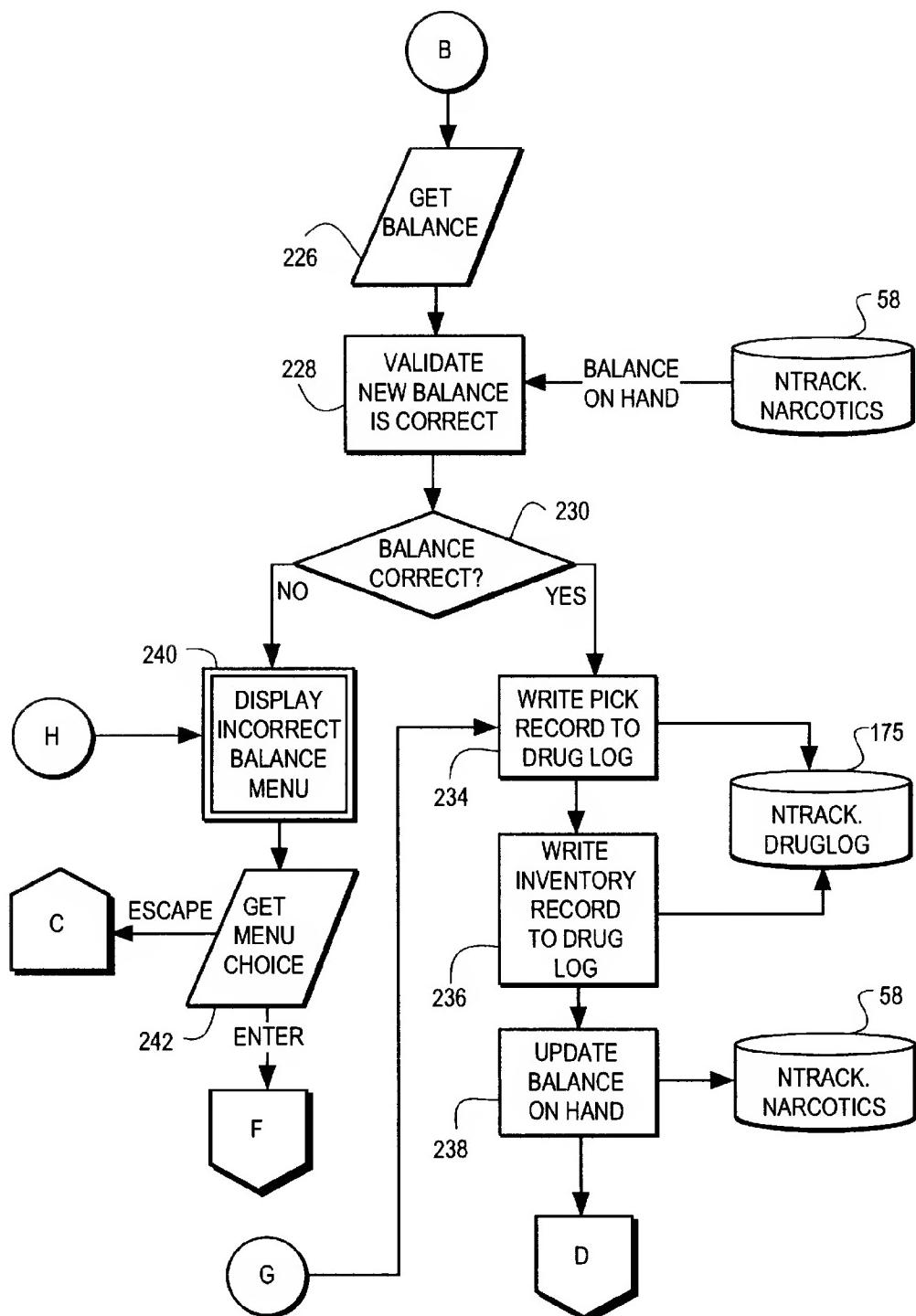
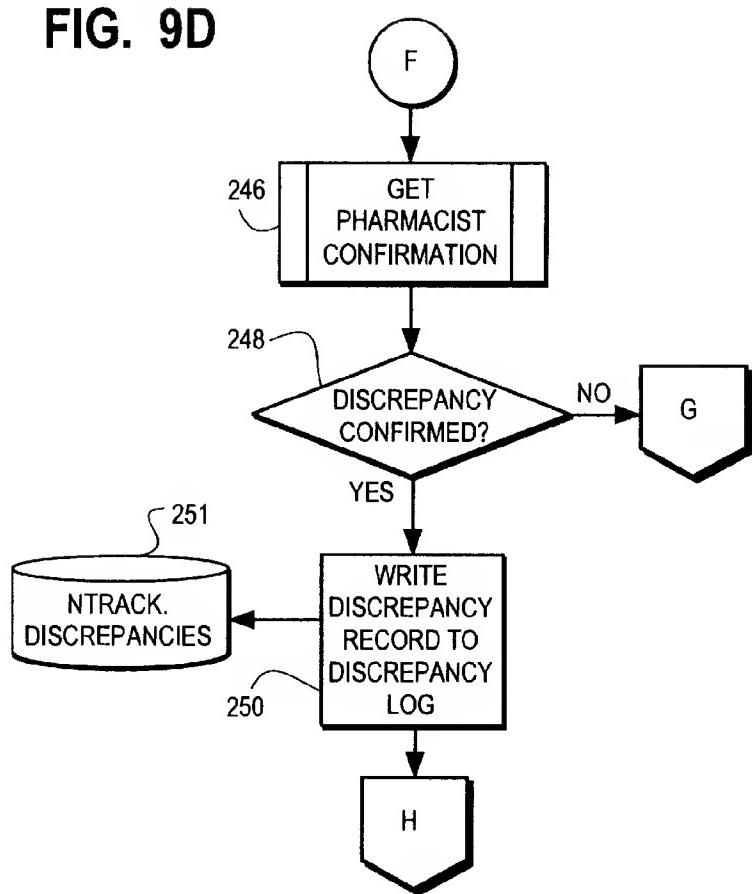
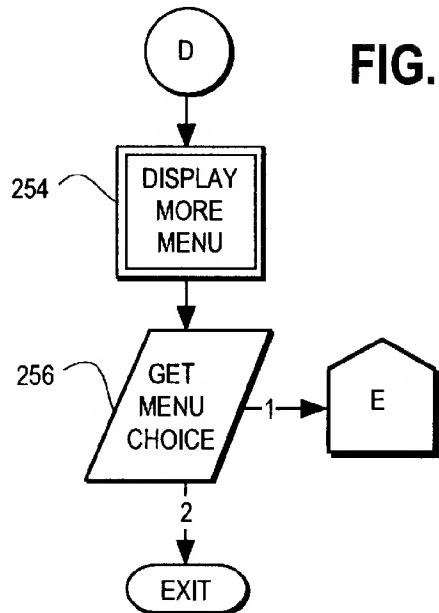
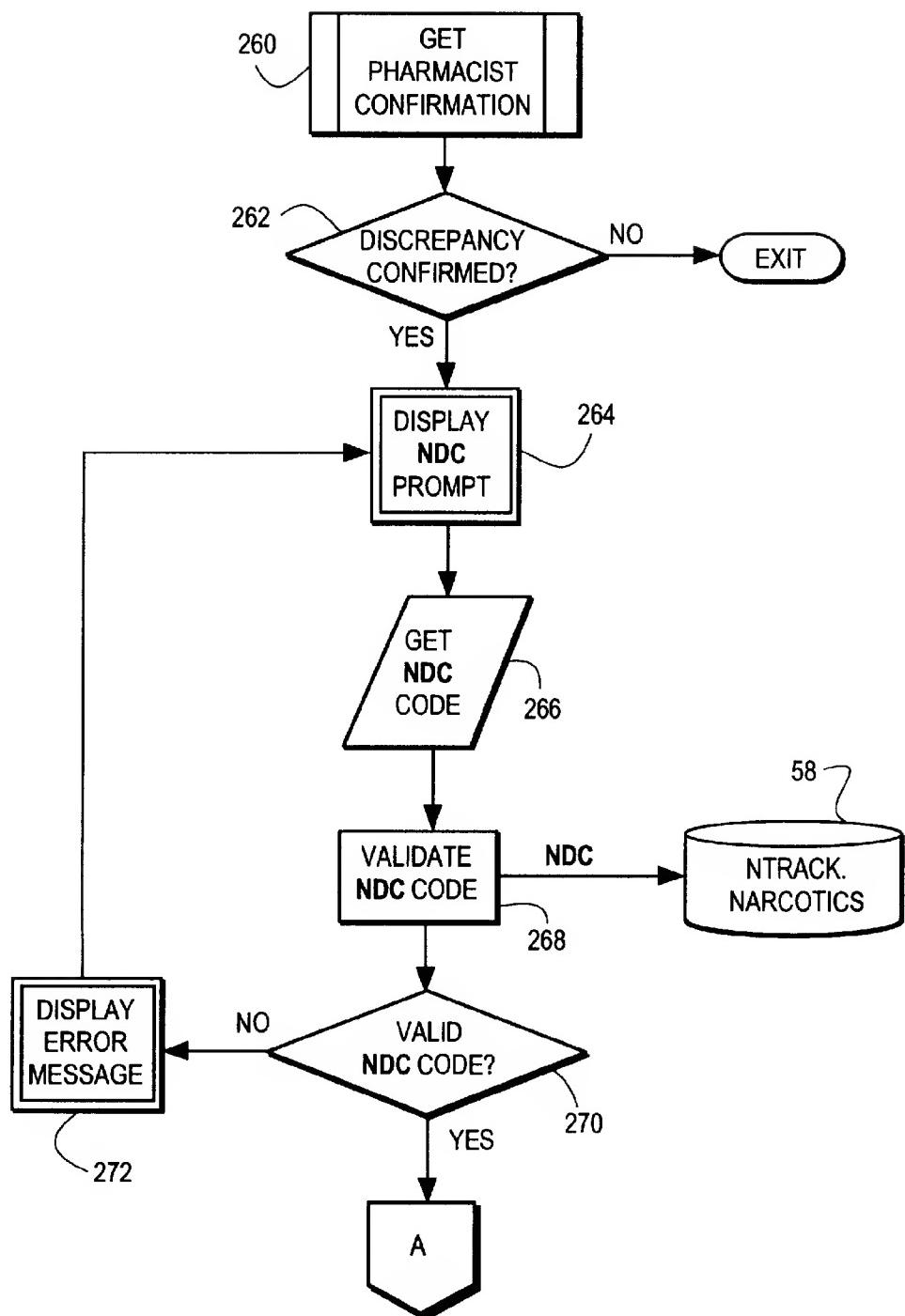
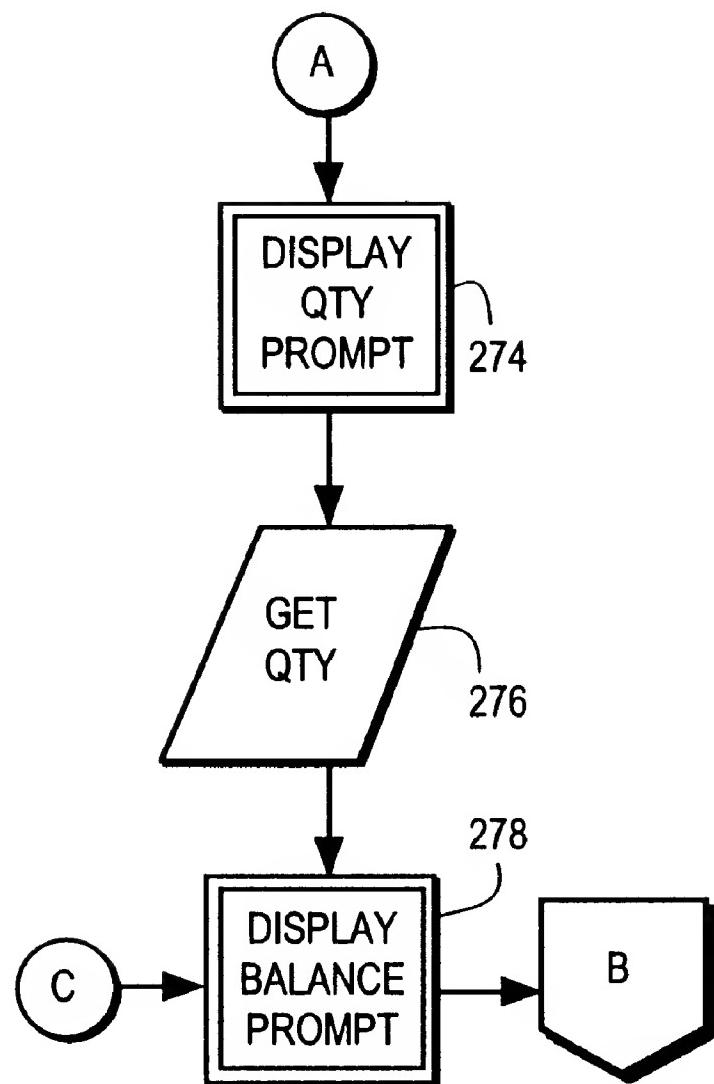
**FIG. 9B**

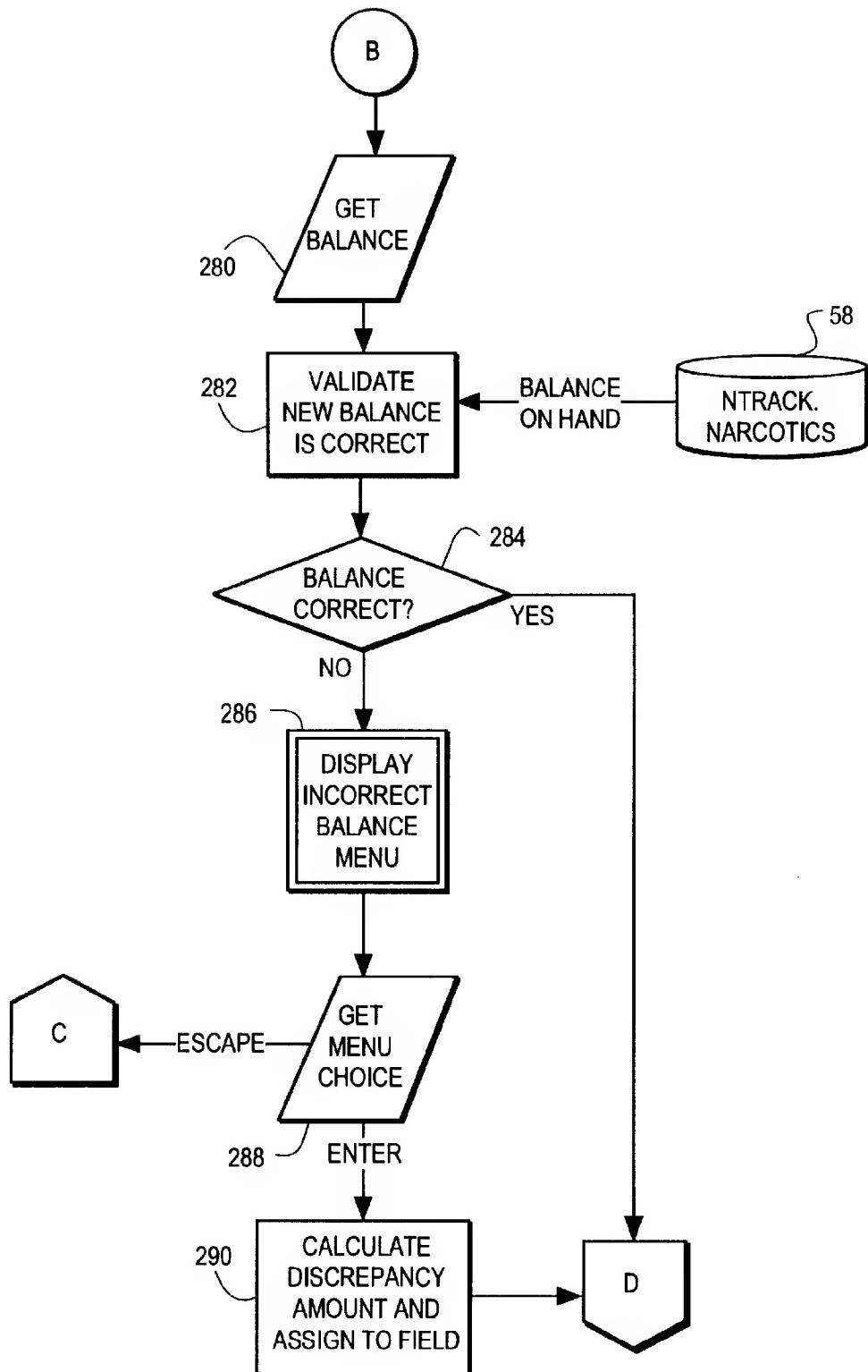
FIG. 9C

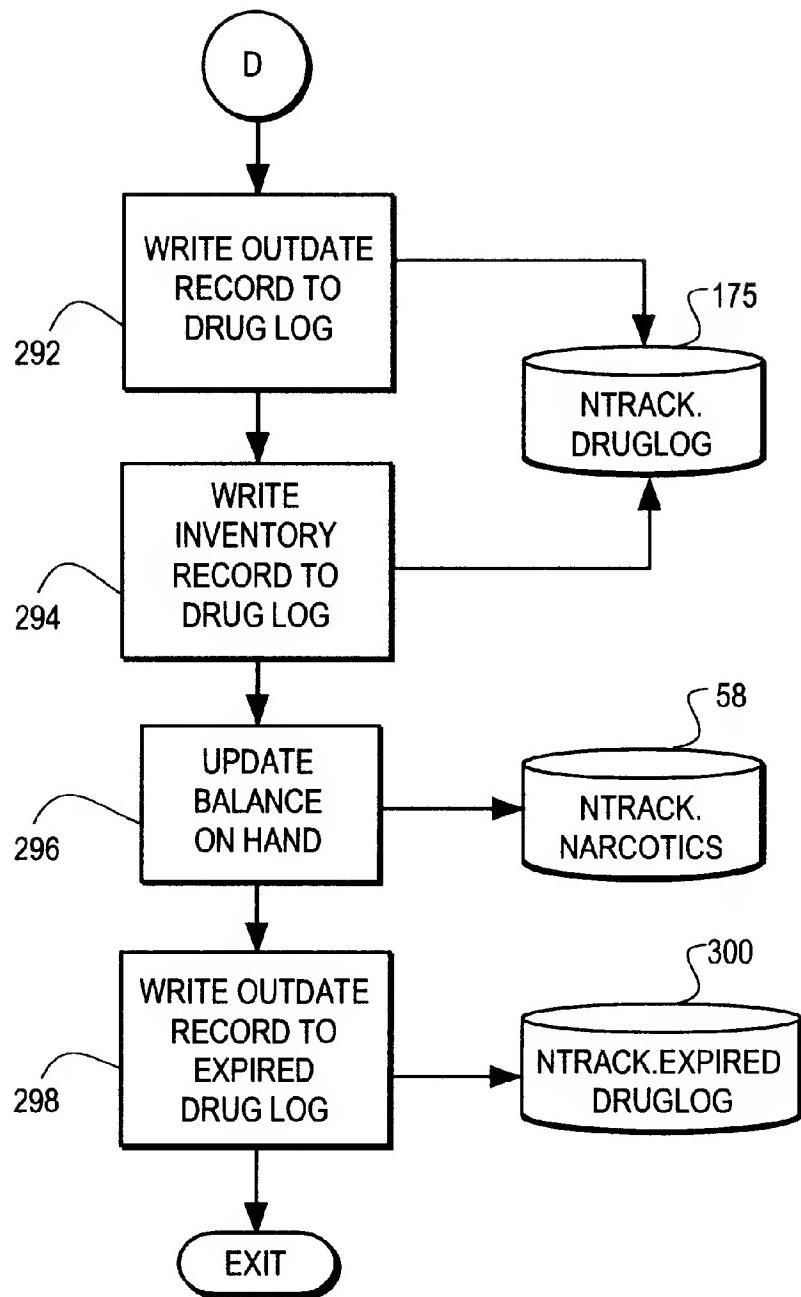


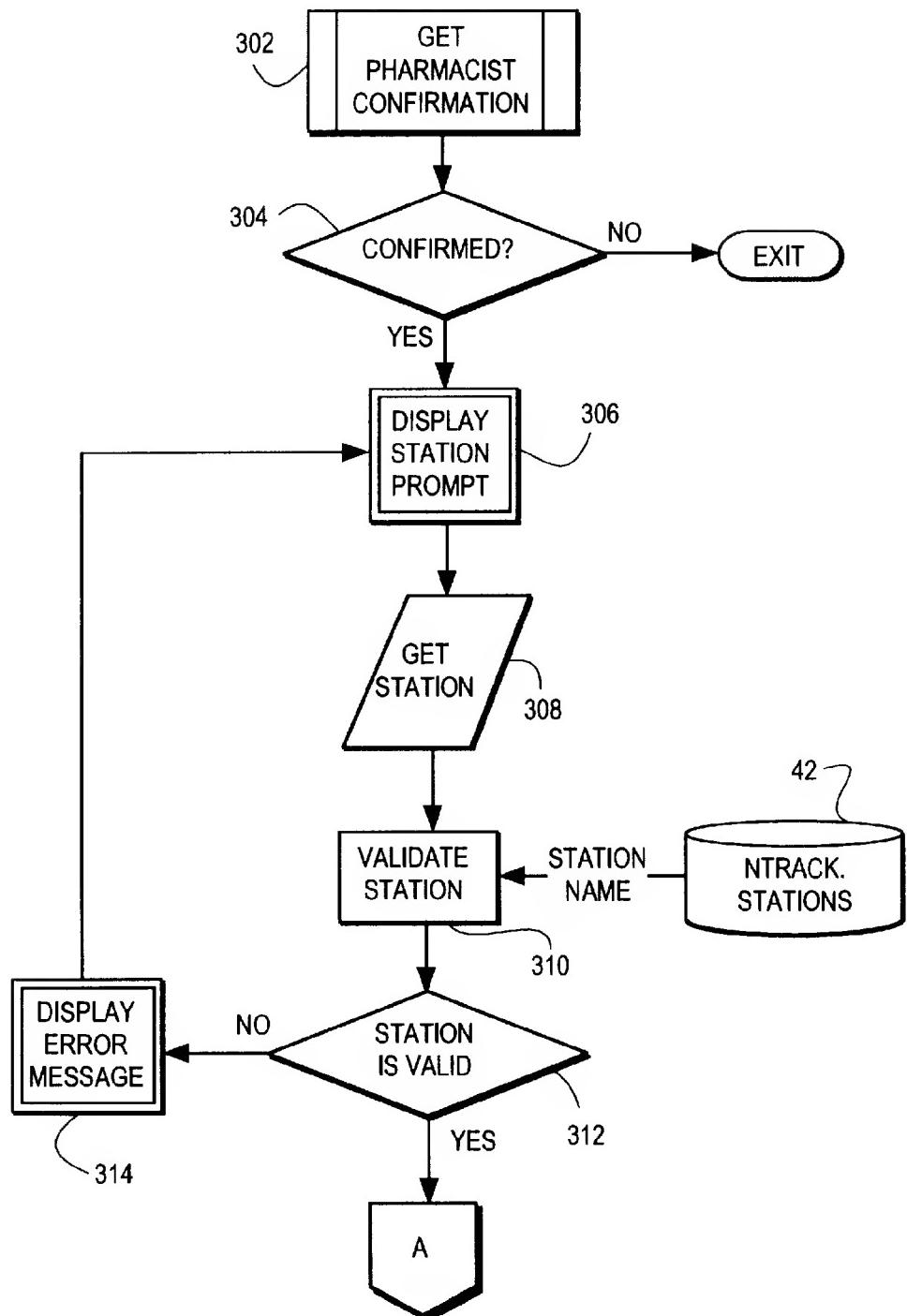
**FIG. 9D****FIG. 9E**

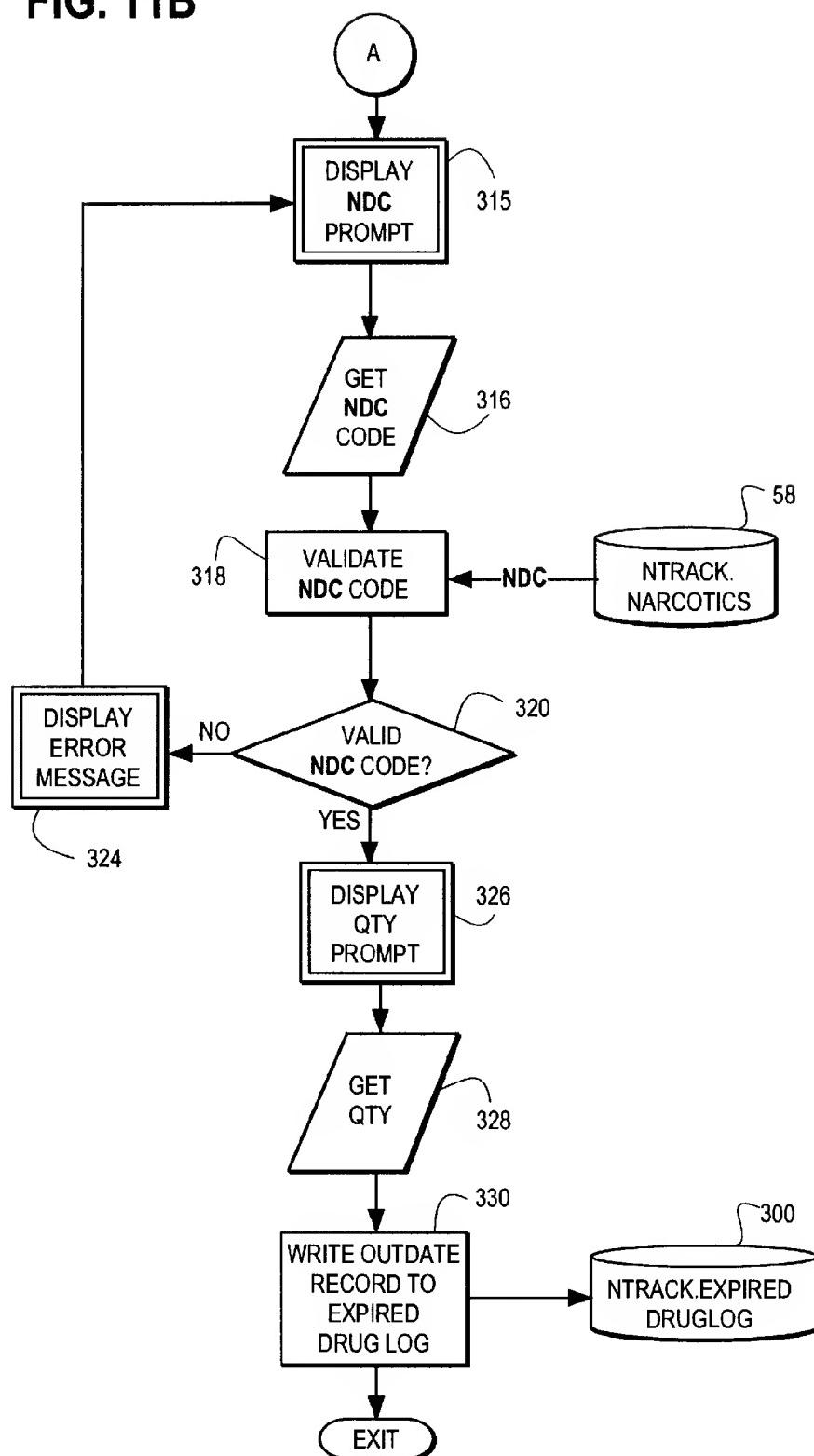
**FIG. 10A**

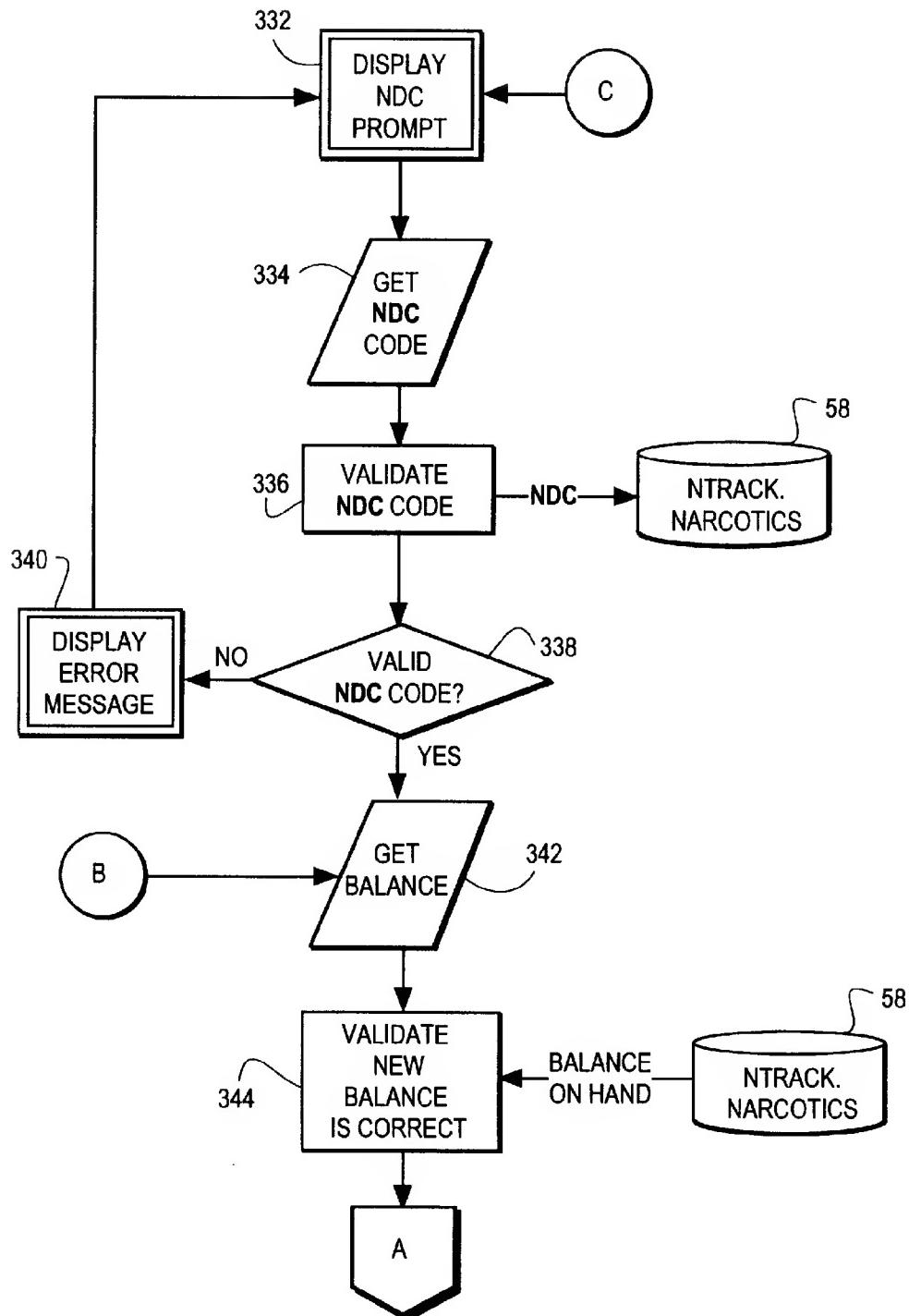
**FIG. 10B**

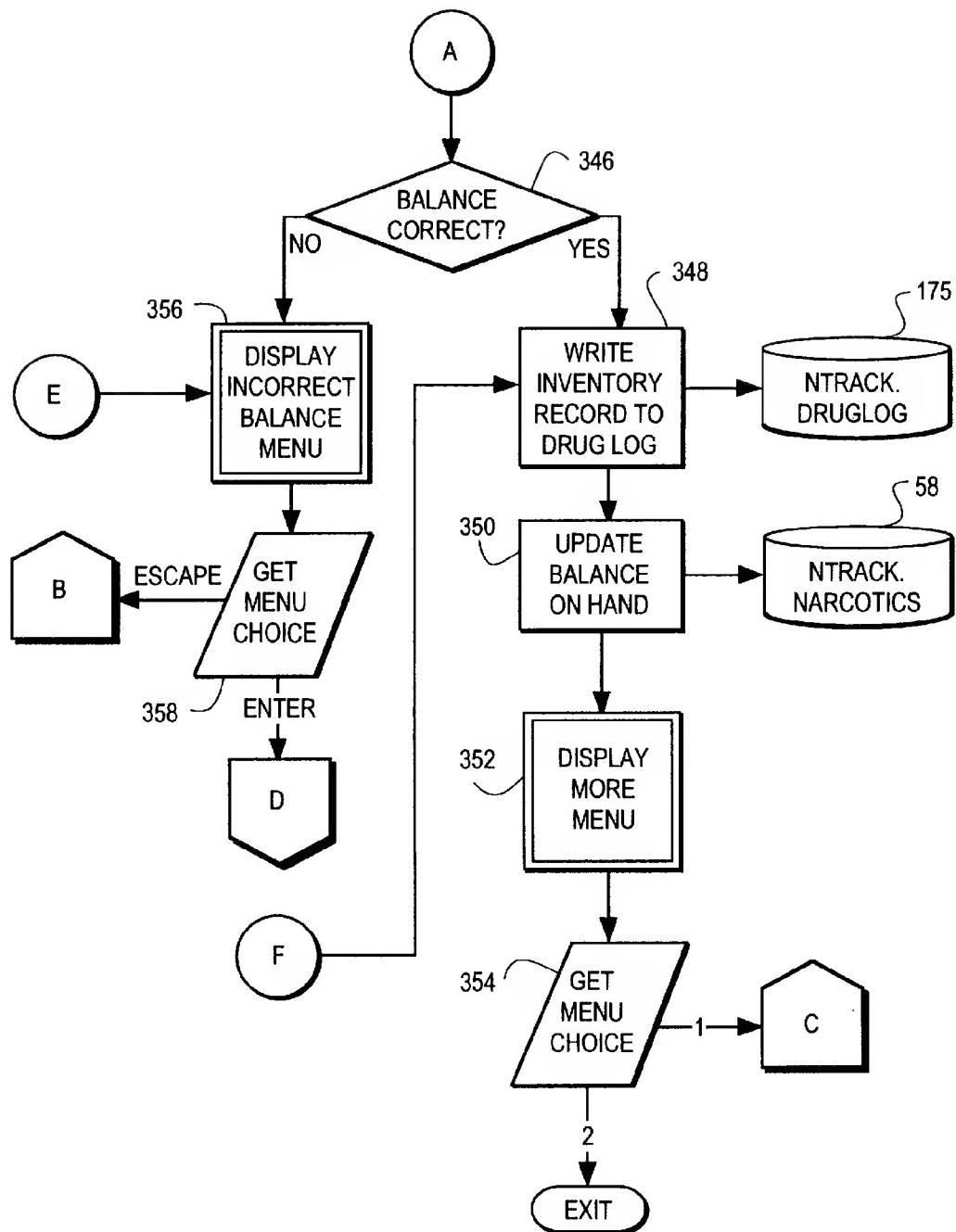
**FIG. 10C**

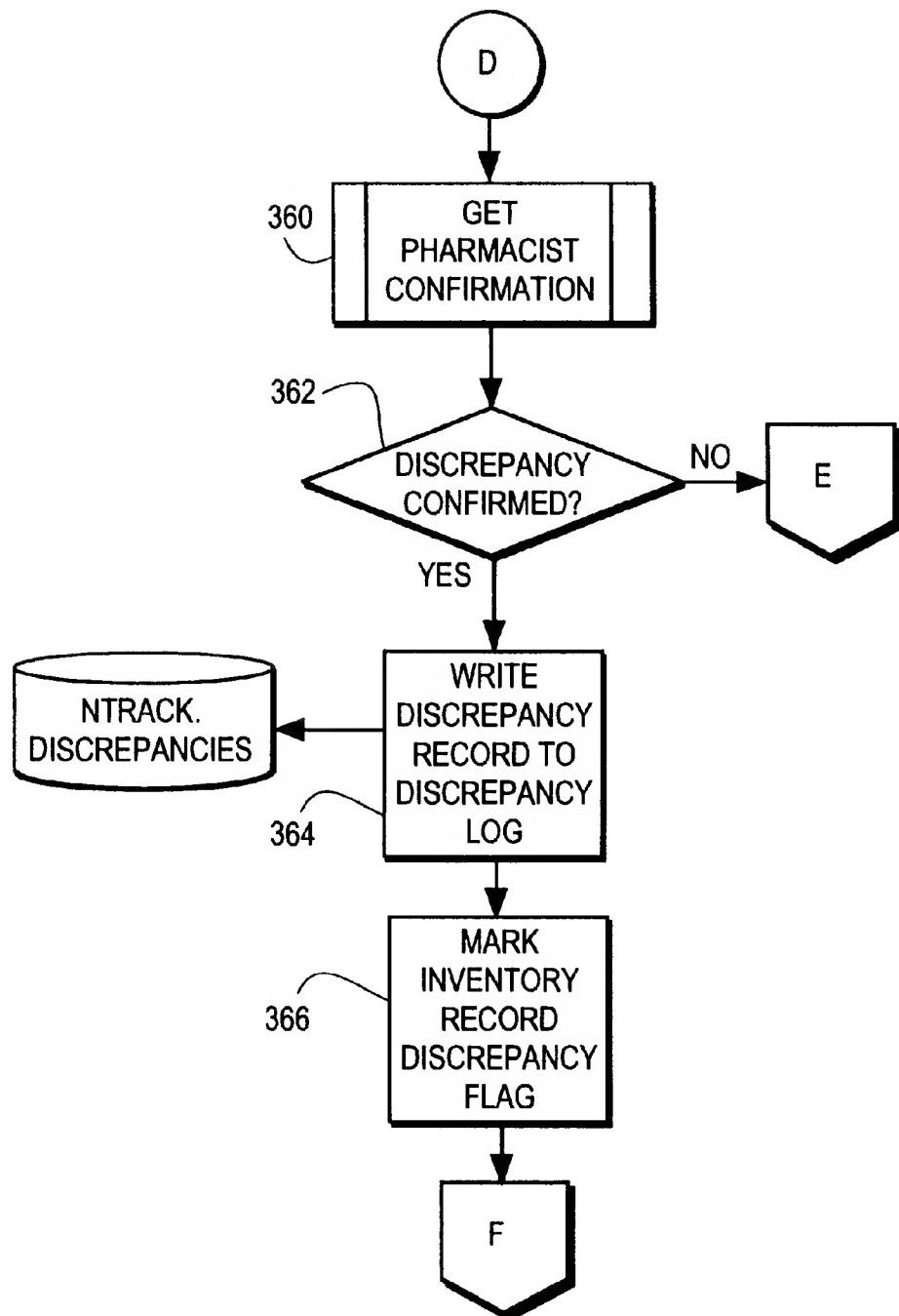
**FIG. 10D**

**FIG. 11A**

**FIG. 11B**

**FIG. 12A**

**FIG. 12B**

**FIG. 12C**

**SYSTEM AND METHOD FOR TRACKING  
DRUGS IN A HOSPITAL**

**TECHNICAL FIELD**

The present invention relates to a drug tracking system and method for use in hospitals, pharmacies, etc. for tracking drugs including narcotics; and more particularly to such a system and method using a portable barcode scanning and printing system to reduce errors in the tracking information, to facilitate the ease and efficiency of tracking and to ensure reproducibility and security.

**CROSS-REFERENCE TO RELATED  
APPLICATIONS**

N/A

**STATEMENT REGARDING FEDERALLY  
SPONSORED RESEARCH OR DEVELOPMENT**

N/A

**BACKGROUND OF THE INVENTION**

Known methods for tracking drugs, particularly narcotics, in hospitals or the like have been manual. The narcotics are typically located in a narcotics safe. The removal of drugs from the drug safe for distribution to nursing stations while tracking the removal is a very time intensive procedure prone to inaccuracies, as is the tracking of the addition of drugs to the narcotics safe. Typical manual tracking procedures are as follows.

In order to distribute the drugs from the safe to the nursing stations, a "pick-list" is first manually generated. A hospital technician gathers drug disposition records and 24 hour nursing audit records from each nursing station. Based upon these records, the technician determines the quantity of each drug at a nursing station and then determines whether that quantity of the drug is below a par level for that particular nursing station. If the final count of a drug is below the par level, an entry is manually made on a pick-list for that nursing station including information identifying the nursing station, the drug name and its strength, and the quantity required to bring the nursing station up to par level for the particular drug. Once all of the disposition records for all of the nursing stations have been processed in this manner, the technician takes the pick-list to the drug safe.

The technician gathers the required quantity of each drug listed on the pick-list for a particular station, one drug at a time. If the required quantity of a drug is contained in a box, the technician writes the nursing station and current date on the box. Otherwise, the drugs are placed in a resealable bag and the nursing station and date are handwritten on a label and the label affixed to the bag. The drug is then checked off from the pick-list for that particular nursing station. When all of the drugs for a nursing station have been picked, the drugs are bundled together with a rubber band and placed aside while the technician picks the drugs for the remaining nursing stations.

When the drugs have been picked for all of the nursing stations, the technician then fills out a Stock Replacement Work Sheet which consists of a large grid with rows representing each nursing station and columns representing each drug that is tracked. For each nursing station on the pick-list and for each drug required for that particular nursing station, the quantity of the drug picked or removed from the safe is recorded in the grid cell in association with the particular nursing station and drug. Then for each drug

on the Stock Replacement Work Sheet, the technician adds the entries for the drug and places a total in the last row in association with the drug column. The Stock Replacement Work Sheet is then used to update the Drug Logs for each drug that was picked.

In accordance with government regulations, each drug has an individual Drug Log that records each transaction that occurs involving the drug. In order to update the Drug Logs for each drug that was picked, the log for the particular drug must be manually retrieved and the following information entered: the current date, the total amount picked as indicated on the Stock Replacement Work Sheet, the technician's initials, a code representing the destination of the drug, and a new balance which is calculated by taking the last balance of the drug and subtracting the amount picked.

Thereafter, a physical inventory of the drug is performed whereby the technician counts the quantity of the drug remaining in the safe. The technician then compares the counted quantity remaining to a balance recorded in the Drug Log for the particular drug. If there is a discrepancy, the technician must find the cause of the discrepancy, i.e. math or entry error and correct it. If the technician cannot determine the cause of the discrepancy, a discrepancy report is filed. It is also not uncommon for drugs to be picked from the safe at irregular intervals before or after the picking process occurs. In these situations, because of the typical urgency to deliver the drug to its intended destination, the Drug Log may not be accurately updated resulting in discrepancies.

When drugs are to be added to the drug safe from a wholesaler or are returned from a nursing station, they must also be recorded on the drug logs. For each drug received, the drug is counted and the Log for the drug is obtained. The technician then manually records the current date, the total amount of the drug counted as being received, the technician's initials, the source of the drugs i.e., the identity of the nursing station or the wholesaler, and a new balance which is calculated by taking the last balance of the drug and adding the amount received. A physical inventory of the drug is then performed. The technician then compares the recorded balance on the Drug Log to the balance resulting from the physical inventory of the drugs. Again, if a discrepancy is found, the technician must find the cause of the discrepancy and correct it or file a discrepancy report.

Each month, the drugs in the safe are also examined to locate any that have passed their expiration date. Outdated drugs are removed from the area in the safe from which the drugs are dispensed to nursing stations and are placed in a separate location in the safe until they are disposed of. For each outdated drug that is removed to the separate disposal location in the safe, the Log for the drug is pulled and the following information recorded: the current date, the quantity of the drug being outdated, the technician's initials, a code representing the destination, i.e. the outdate location within the safe or a destruction location and a new balance which is calculated by taking the last balance of the drug and subtracting the amount being outdated. A physical inventory of the drug is then performed as discussed above with discrepancies either being corrected or being accounted for by the filing of a discrepancy report. An entry is also manually made in a Discarded Meds Drug Log for outdated drugs. This Log tracks the outdated drugs until they are disposed of and contains the same information as the regular Drug Logs. The manual entry of the required information by handwriting the entries or even by manually entering the information into a computer is expensive, labor intensive and is prone to inaccuracies requiring many hours to resolve and to report the discrepancies.

Automatic systems for dispensing drugs are known such as described in U.S. Pat. No. 5,762,235. However, these systems do not track the location of the drug.

#### BRIEF SUMMARY OF THE INVENTION

In accordance with the present invention, the disadvantages of prior methods for tracking drugs as discussed above have been overcome. The system and method of the present invention utilize a portable scanning and printing system for tracking drugs maintained at a location so as to minimize the manual entry of tracking data and automatically update the requisite records to improve the accuracy, speed and efficiency of the drug tracking.

More particularly, the portable scanning and printing system includes a memory for collecting data, a display, a printer and a number of input means including a barcode scanner, a keyboard or keypad, and a wireless communication interface. The wireless communication interface allows the portable scanning and printing system to communicate with a host system having a memory for storing drug tracking records wherein the host system automatically updates the drug tracking records from information transmitted thereto by the portable scanning and printing system.

The portable scanning and printing system is operated in accordance with the method of the present invention so as to receive user identification information from one of the input means; to receive from the scanner, scanned barcode data representing the identity of a drug maintained at the location; and to receive from the keyboard data confirming a quantity of a drug being added to or removed from the location. The portable scanning and printing system associates the data entered from the various input means and automatically transmits to the host system via the communication interface selective, associated information regarding the addition of the drug or the removal of the drug from the location so that the records at the host can be automatically updated. The information includes the user's identification, the destination or source, the identity of the drug and the quantity of the drug being added or removed. Any labels that are required are printed by the portable scanning and printing system from the information entered from the various input means during the drug tracking operation without the necessity to re-enter any data. The portable scanning and printing system automatically selects which associated information is to be printed and prints the labels at the location where they are needed. This operation of the portable scanning and printing system for tracking drugs maintained at a location drastically improves the speed and accuracy of tracking drugs.

In accordance with another feature of the present invention, the portable scanning and printing system is operated to receive from the keyboard, data representing a quantity of the drug that the user counts as remaining at the location, i.e. a user entered balance. The portable scanning and printing system verifies the user entered balance by wireless communication with the host system and the use of the host system's records. In particular, the user entered balance is compared to the balance data for the drug maintained in the host's stored drug tracking records. This comparison may be done by the portable scanning and printing system upon receipt of information representing a balance stored in the host's records or upon the updating of balance data stored in the portable system's memory. Alternatively, the comparison can be made by the host system in which case the host transmits the results of the comparison to the portable scanning and printing system

which thereafter uses the results to verify the balance. The user entered balance is verified if the comparison results in a determination that the user entered balance matches the balance maintained in the host's records. If the user entered balance is not verified, the portable scanning and printing system allows the user to re-enter the counted quantity so that any counting errors can be immediately corrected. Alternatively, if a discrepancy is confirmed, the portable scanning and printing system determines the amount of the discrepancy and a discrepancy record is automatically transmitted to the host system.

In accordance with another feature of the present invention, the portable scanning and printing system automatically prompts the user to pick drugs identified by pick-list information received from the host system. After prompting the user to pick a particular drug, by displaying information identifying the drug to be picked for a particular destination, the user scans a barcode associated with the identified drug, the barcode typically being located on the shelf supporting the drug, or on a drug container. Upon receiving a scanned barcode representing the identity of a drug, the portable scanning and printing system compares the identity of the drug represented by the scanned barcode data to the identity of the drug received from the host system. If there is no match, an error message will be displayed for the user so as to advise the user that the wrong drug was scanned. By prompting the user for a particular drug and automatically verifying whether the user entered drug identity matches the drug that the system has prompted the user to pick, the present invention insures that the correct drugs are picked and that all of the drugs identified on the pick-list for a particular nursing station are picked so as to increase the accuracy, speed and efficiency of the operation.

The system and method of the present invention can be utilized to track drugs removed from a location with a pick-list or without a pick-list, to track drugs received at a location, to outdate drugs and to inventory drugs accurately and efficiently. These and other advantages and novel features of the present invention, as well as details of an illustrated embodiment thereof, will be more fully understood from the following description and drawings.

#### BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

FIG. 1 is a block diagram of the system of the present invention including a portable scanning and printing system for tracking drugs maintained at a location and a host system to which the portable system communicates;

FIG. 2 is a block diagram of one embodiment of the portable scanning and printing system for tracking drugs as illustrated in FIG. 1;

FIGS. 3A, 3B and 3C form a flow chart illustrating the operation of the host processing system in generating a pick-list;

FIG. 4 is a flow chart illustrating various operations of the portable scanning and printing system for tracking drugs;

FIG. 5 is a flow chart illustrating a user login operation of the portable scanning and printing system;

FIGS. 6A, 6B and 6C form a flow chart illustrating the operation of the portable scanning and printing system when drugs are picked from a pick-list;

FIGS. 7A, 7B, 7C and 7D form a flow chart illustrating an inventory operation of the portable scanning and printing system for drugs picked from a pick-list;

FIG. 8 is a flow chart illustrating an operation of the portable scanning and printing system in obtaining pharmacist confirmation;

FIGS. 9A, 9B, 9C, 9D and 9E form a flow chart illustrating an operation of the portable scanning and printing system for picking drugs not on a pick list and for receiving drugs;

FIGS. 10, 10B, 10C and 10D illustrate an operation of the portable scanning and printing system for performing an outdated operation for inventoried drugs;

FIGS. 11A and 11B form a flow chart illustrating an operation of the portable scanning and printing system for outdated drugs that are not inventoried; and

FIGS. 12A, 12B and 12C form a flow chart illustrating an operation of the portable scanning and printing system for providing an inventory of drugs maintained at a location.

#### DETAILED DESCRIPTION OF THE INVENTION

FIG. 1 illustrates a system for tracking drugs, including narcotics, at hospitals, clinics, pharmacies, etc. The system includes a P.C. based server 10 having a personal computer (P.C.) 12 or the like with associated memory 13, a display 14, a keyboard 15 and/or mouse. The P.C. 12 is coupled to a local area network (LAN) 18 that includes the capability of wireless communication. One example of a suitable local area network 18 is a token ring although other types of LANs can be used as well. A radio frequency access point 19 on the local area network allows the P.C. based server 10 to communicate i.e. transmit and receive, wireless communications with the portable barcode scanning and printing system 20. Whereas, the P.C. based server 10 with wireless communication capability forming a host system maintains drug tracking records in its associated memory, the portable barcode scanning and printing system 20 allows drug tracking data to be collected, verified and recorded with minimal input from the user so as to increase the speed and accuracy of the drug tracking operation.

The portable scanning and printing system 20 in accordance with one embodiment of the present invention as shown in FIGS. 1 and 2 is a hand-held integrated unit. Because it is portable, the user can track a drug and print barcoded labels therefrom at the drug's location on a shelf in the safe without moving to other locations to obtain Drug Logs or to use fixed location data entry and printing terminals. Because movement of the user away from the drug's shelf location is eliminated, numerous errors in the tracking process are eliminated and the accuracy and efficiency of the operation greatly increases.

The portable scanning and printing system 20 includes a number of input means for entering data into the system 20 including a barcode scanner 22, a keyboard 24 and a radio frequency communication interface 26. The barcode scanner 22 is operated to scan a barcode containing National Drug Code (NDC) information that identifies a drug, i.e. the drug's name and its strength. The keypad or keyboard 24 is used to enter alpha-numeric information into the system 20. The keyboard 24 can include a large number of keys or it can include a minimal number of keys one of which is used as a cursor or the like. The radio frequency (R.F.) communication interface 26 with associated antenna 27 includes a receiver and transmitter or transceiver to allow two-way communications between the portable scanning and printing system 20 and the host system 10 as discussed in detail below.

The portable scanning and printing system 20 includes a display 28 that is controlled to display prompts to the user to enter particular information so as to lead the user through a drug tracking operation in order to prevent the user from

forgetting to enter information that is necessary to track a drug. The portable scanning and printing device 20 also includes a barcode printer 30 that is preferably a label printer. In the embodiment shown in FIG. 1, the printer portion 30 of the portable scanning and printing system 20 is a labeler that includes a label applicator 31 for applying labels 29 after they have been printed. The portable scanning and printing system 20 includes a processing unit 32 with one or more microprocessors for controlling the various input and output devices and for controlling the collection of data in the memory 34. In particular, the processing unit 32 collects data in the memory 34 by selectively associating input information received from two or more of the input means 22, 24 and 26. Such selective association of data in the memory 34 allows the processing unit to transmit and/or print selected portions of the associated data. Therefore, the portable scanning and printing system is an intelligent system and not merely an input and/or output device for the host system 10. In the preferred embodiment, the portable scanning and printing device has a handle 36 and a trigger 38 mounted on the handle so as to actuate the barcode scanner 22 and/or printer portion 30 of the system 20 in accordance with the software of the processing unit 32. In this embodiment, the barcode scanner 22 and printer 30 are contained within a housing 39 forming a single integrated unit that is portable. Details of a portable scanning and printing system such as described above are found in U.S. Pat. No. 5,483,624, entitled Programmable Hand Held Labeler, assigned to the assignee of the present invention and incorporated herein by reference. However, other configurations of the portable scanning and printing system 20 can be utilized in accordance with the present invention as well. For example, in another embodiment, a portable barcode scanner with data collection capabilities can be coupled via a hard wired connection to a portable or mobile printer. In another embodiment of the portable scanning and printing system 20 in accordance with the present invention, the portable scanner with data collection capabilities may communicate with a portable or mobile printer via RF communication. In still another embodiment, a scanner without data collection capabilities may be used with an intelligent printer capable of associating data received from the scanner portion, R.F. communication portion and the keyboard. Although the printer portion 30 of the portable scanning and printing system 20 need not necessarily be portable, in accordance with the present invention, a mobile printer is preferred since the mobility of the printer as well as the portability of the scanner allows the scanning and printing of labels to occur at the location of a particular drug in the drug safe. This feature allows the technician to complete the removal, addition and/or inventory of a single drug without the necessity of moving to another location within or outside of the safe before the tracking operation for that drug is completed. Thus, the efficiency as well as accuracy of the tracking system and method are greatly increased.

In accordance with the present invention, drugs may be picked i.e., removed from a location, based on a pick-list generated by the host system 10 or without the use of a pick-list as described in detail below. If a pick-list is to be used for the picking operation, a pick-list is generated by the P.C. 12 in accordance with the routine depicted in FIGS. 3A-3B. Upon entering the pick-list entry mode of operation, the P.C. 12 at a block 40 retrieves the various stations, in this example, nursing stations, from the Station records 42 stored in the P.C. server's memory and loads the retrieved stations into a selection box depicted on the display 14. The P.C. is responsive at block 43 to a user's selection of a station

depicted on the display 14 to retrieve, at block 44, the drugs assigned to the selected station from the Drug or Narcotics records 58 of the P.C. server's memory. At block 44 the P.C. 12 loads a pick list grid depicted on the display with the retrieved list of drugs for the selected station. At block 46, the P.C. 12 loads for each drug listed in the pick list grid the amount of the drug to be picked as indicated in the pick list records 48 previously stored for the station. Thereafter, the P.C. 12 proceeds to block 49 to determine whether new drugs are to be assigned to the station based on user selection of a displayed "Narcotics Button" at block 50. If so, the P.C. 12 proceeds to block 51 to execute the routine depicted in FIG. 3C.

Upon entering the routine of FIG. 3C, the P.C. 12 loads at block 52 a list of selectable narcotics retrieved from the narcotics records 58 into a "Narcotic Grid" depicted on the display 14. At block 53, the P.C. 12 automatically selects all of the narcotics that were previously assigned to the station. Thereafter, for each drug depicted in the "Narcotics Grid" as determined at block 55, the P.C. 12 determines at block 54 whether or not it is to be assigned to the station. In particular, at block 56, the P.C. 12 is responsive to user selection of a drug in the grid to assign it to the station. Alternatively, if the P.C. 12 determines at block 57 that the user cleared the drug selection from the grid, the narcotic is not assigned to the station. At block 58, the P.C. 12 proceeds to the next narcotic listed in the "Narcotic Grid" to determine whether it is to be assigned to the station or not and continues until all of the necessary drugs have been assigned to the station. Thereafter, the P.C. 12 returns to the pick list entry routine at block 59 of FIG. 3B.

At block 59, the user selects a narcotic in the pick list grid depicted for the station. At block 60 the user acknowledges as correct the amount of the drug to be picked in the grid if it is the same as indicated by the pick list records 48 and loaded into the grid at block 46. Alternatively, if a new amount is to be entered for the drug, the user enters the new amount of the drug to be picked into the displayed grid at block 60. At block 61, the P.C. 12 determines whether more narcotics are to be picked for the particular station and if so, proceeds back to block 59. When the user finishes the pick list for a particular station, the P.C. proceeds to block 62 to determine whether pick lists are to be generated for other stations. If so, the P.C. 12 proceeds back to block 43 so that the process can be repeated. When the user has finished the pick list entry process as indicated by the user selecting a displayed "OK button" at block 63, the P.C. 12 proceeds to block 64. At block 64, the pick list records generated during the operation of the flow charts of FIGS. 3A-3C are written to the database pick list records 48.

In order to use the portable scanning and printing system 20 for tracking drugs at a location, the user starts up the system 20 in a banner/log in mode at block 66 of FIG. 4. This mode as depicted in FIG. 5 starts with the processing unit 32 depicting a start up or introduction display screen on the display 28 at a block 72. Thereafter, the processing unit 32 displays a prompt at a block 74 for the user to enter his identification. The user may enter his identification via the keyboard 24 or if the user has a badge or the like with a barcoded identification, the user can enter his identification using the barcode scanner 22. The processing unit 32 receives the entered user identification at a block 76 and thereafter, prompts the user at a block 78 via the display 28 to enter the user's password. The processing unit 32 at block 82 checks the entered password to determine whether the password is valid or not at a block 84. If the password is determined at block 84 to be invalid, the processing unit 32

controls the display 28 to display an error message at block 86, the processing unit 32 thereafter returning to block 74. If the user has entered a valid password, the processing unit 32 returns to the routine depicted in FIG. 4 at block 68. If the processing unit determines at block 68 that a pick list has been suspended, it will proceed at block 69 to the routine depicted in FIGS. 6A-6C. Otherwise, the processing unit proceeds to block 88.

The processing unit 32 at block 88 causes the main menu of the system to be depicted on the display 28. The main menu depicts the various drug tracking operations that can be performed with the portable scanning and printing system 20 including picking operations, receiving operations, update operations and an inventory operation. Thereafter, the processing unit 32 receives at a block 90 the user's choice selected via the keyboard 24 and executes the routine 91, 92, 93 or 94 associated with the selected operation.

Upon entering the picking routine at block 91, the processing unit 32 controls the display 28 to depict various picking operation menu choices including a Pick-List Picking operation and No Pick-List Picking operation for the user's selection. If the user selects the option to pick drugs in accordance with a pick-list, the processing unit executes the routines depicted in FIGS. 6A-6C and FIGS. 7A-7D. If the user selects the option to pick drugs without a pick-list, the processing unit executes the routine depicted in FIGS. 9A-9E.

Upon entering the Pick-List Picking routine depicted in FIGS. 6A-6C, the processing unit 32 at a block 96 retrieves one pick-list record from the host system's Pick-List records 48. After receiving at block 98, the pick-list record which contains the identity of a station representing the destination of the drug being a-picked, the identity of a drug including its strength and the quantity of the drug to be picked for that particular station, the processing unit 32 proceeds to block 114. At block 114, at the start of a picking operation for a particular drug, the processing unit 32 displays information identifying the drug to be picked for a particular nursing station to prompt the user to pick the correct drug. This prompt may include National Drug Code (NDC) information i.e., information identifying the name of the drug and its strength. In response to the display of the NDC prompt at block 114, the user scans a barcode, typically contained on a shelf supporting the drug on a drug container itself, where the barcode represents the drug identified in the displayed prompt. At block 116, the processing unit 32 receives from the barcode scanner 22 the data representing the scanned barcode including the NDC. Thereafter, the processing unit determines whether the suspend key of the keyboard 24 has been actuated at a block 118. If so, the processing unit 32 exits the routine. If the suspend key was not pressed as determined at block 118, the processing unit 32 proceeds from block 118 to block 126. At block 126, the processing unit compares the scanned NDC data received at block 116 with the NDC data contained in the pick-list record retrieved from the host system 10. At block 128, the processing unit 32 determines whether these two NDCs match and if not, the processing unit at block 130 displays a message to the user on the display 28 indicating that the user has scanned the wrong NDC code. This feature warns the user that he was about to pick the wrong drug and thus increases the accuracy of the picking operation and thus the drug tracking as well. After displaying the error message at block 130, the processing unit will thereafter return to block 114 to prompt the user via the display 28 to pick the correct drug and associated strength as indicated on the pick-list.

If the processing unit 32 determines at block 128 that the scanned NDC matches the NDC in the pick-list record

received from the host system, the processing unit proceeds from block 128 to block 132. At block 132, the processing unit 32 controls the display 28 to depict a message to the user to prompt the user to enter the quantity to be picked. This prompt will actually display the quantity from the pick-list so as to advise the user of the quantity that the pick-list records indicate should be picked for a particular nursing station. However, the user has the option to select the displayed quantity for picking or to enter a new quantity. At block 134, the processing unit 32 retrieves from the keyboard 24 the quantity of the drug entered by the user as being picked. It is noted, the value that may be retrieved may represent an actual numeric quantity or if the user selects the quantity displayed at block 132, the received quantity information may actually be represented by an indication that an enter key or the like has been pressed indicating to the processing unit 32 that the displayed quantity has been selected by the user and is the "picked" quantity.

After receiving the quantity being picked by the user at block 134, the processing unit 32 proceeds to block 136 to determine whether the suspend key of the keyboard 24 has been actuated and if so, the processing unit 32 exits the routine. If the suspend key was not pressed, the processing unit proceeds from block 136 to block 138. At block 138, the processing unit updates the pick-list record in the memory 34, by associating the user entered quantity being picked with the pick-list record information received from the host system for the particular drug picked. From block 138, the processing unit proceeds to block 140. At block 140, the processing unit 32 sets a flag in Narcotic table stored in the memory 34 indicating that this drug was picked. At block 140, the processing unit also updates the narcotic record for the drug in the memory 34, the record originally received from the host system's Narcotic records 58. When updating the Narcotics record in the memory 34, the processing unit 32 automatically calculates a balance on hand by subtracting the quantity received at block 134 from the old balance in the record. Thereafter, the processing unit proceeds to block 142 from block 140.

At block 142, the processing unit 32 causes the printer 30 to print selected information associated with the picked drug by the processing unit 32 in the memory 34. The information printed on the label includes the intended destination of the drug which is automatically printed to prevent the drug from being sent to the wrong location. The information printed on the label also includes the barcoded NDC data for the drug so that the drug can be tracked by a portable scanning and printing system 20 at its destination location. The automatic continuation of the tracking data throughout various locations of a hospital via the use of multiple portable scanning and printing systems all in communication with the host allows tight control over drugs and current as well as accurate drug tracking records. It is noted, that the user may enter the number of tracking labels to be printed via the keyboard 24 or alternatively, this information may be stored in association with the pick-list data. For example, one label may be printed to be applied to a box containing the picked quantity of a particular drug, or multiple labels may be printed for application to individual drug containers if the drug is so packaged. After the processing unit 32 controls the printer 30 to print the requisite number of labels, the user applies the labels directly to the packaging for the drugs and then continues the picking operation. The processing unit 32 determines at block 144 whether there are more pick records by querying the host system 10. If the host system indicates that there are more pick records, the portable barcode scanning and printing system will receive the next pick-list

record at a block 146 and return to block 114 to display the NDC prompt associated with the next pick-list record.

After picking the drugs for each station on the pick-list as determined at block 144, the processing unit proceeds from block 148 of FIG. 6C to the routine depicted in FIGS. 7A-7D so as to inventory the drugs picked on the pick list. This inventory operation automatically determines whether the quantity of a drug remaining after having been picked for one or more stations matches a balance on hand quantity automatically calculated by the system 20 as the drugs on the pick-list were being picked. In order to inventory the drugs picked in accordance with a pick-list, the processing unit 32 looks to the Narcotics table stored in the memory 34 to determine which of the drugs were marked picked at block 140. For each of the drugs that were marked as picked at block 140 as indicated at block 152, the processing unit 32 implements the remaining steps depicted in the flow charts of FIGS. 7A-C. First, the processing unit controls the display 28 to depict a message to prompt so as to prompt the user to scan a barcode for the displayed NDC information including drug identity and strength. Thereafter, at block 156, the processing unit receives the scanned NDC data from the barcode scanner and proceeds to block 158 to compare the scanned NDC data with the NDC data contained in the Narcotic record stored in the memory 34 for the drug marked as having been picked and identified in the NDC prompt at block 154. At block 160, the processing unit determines whether there is a match between the scanned NDC information and the expected NDC data. If there is not a match, the processing unit 32 depicts an error message at block 162 on the display 28 and proceeds back to block 154 to prompt the user to scan the correct barcode associated with the drug from the pick list being inventoried. If there is a match as determined at block 160, the processing unit 32 proceeds to block 164 to display a balance prompt message. The balance prompt message prompts the user to count the quantity of the drug associated with the scanned NDC remaining at the location after a quantity has been picked, i.e. removed in accordance with the pick-list. After receiving the user entered balance at block 166, the processing unit 32 proceeds to block 168 to determine whether it is the same as the balance calculated and updated by the portable scanning and printing system 20 when executing block 140 each time the drug was picked for a different station on the pick list. If the balance is determined to be correct at block 170 by the unit 32 comparing the user entered balance and the balance on hand stored in memory 34 to determine if they match, the processing unit proceeds to block 172; however, if the balance is not correct, the processing unit proceeds to block 178 as discussed below.

At block 172 the processing unit 32 creates a dispense record in the memory 34 using the pick-list record maintained in the memory 34 where the dispense record confirms the removal of a particular drug from the location. The dispense record identifies the drug including its strength, the quantity removed i.e. dispensed, and the destination of the drug after it was removed from the location. At block 172, the dispense record is also transmitted via the communication interface 26 to the host system so that the host system can update its pick-list records 48 in its memory. From block 172, the processing unit proceeds to block 174. At block 174, the processing unit writes an inventory record for the particular drug indicating the quantity of the drug remaining at the location in the memory 34 and transmits the information to the host system so that the Drug Log memory 175 maintained at the host 10 may be updated with the inventory records from the portable scanning and printing system and

from the pick-list records maintained at the host. From block 174, the processing unit 32 proceeds to block 176 to update the balance on hand in the narcotics record of the memory 34 and the flag in the Narcotics table for the picked drug to indicate that the balance for this drug has been checked and inventoried. The portable scanning and printing system at block 176 also transmits information to the host system to update the Narcotics records contained in the narcotic record memory 58. Thereafter, the processing unit at 177 returns to block 152 to inventory the next drug with the flag still set as indicating that the drug was picked via the pick list but that the balance was not inventoried as of yet.

If the balance received from the user at block 166 is determined by the processing unit 32 to be incorrect at block 170, the processing unit proceeds to block 178 from block 170 to control the display 28 to display an Incorrect Balance Menu. If the user determines that the remaining quantity of the drug was correctly counted and correctly entered into the system 20, the user selects an option to obtain a pharmacist's confirmation of a discrepancy. Upon receiving the selection of pharmacist's confirmation, the processing unit proceeds to block 182 to execute the routine depicted in FIG. 8.

As shown in FIG. 8, the processing unit 32 obtains the pharmacist's user identification at block 184 from one of the input means as discussed above with respect to the user identification. Thereafter, the processing unit receives at block 186 from the keyboard an authorization code entered by the physician. At block 188, the portable scanning and printing system requests information from the host system 10 so as to confirm at block 192 that the correct and valid data was received at block 184 and 186. If the data was not correct, the system 20 will allow the pharmacist to re-enter the information by returning to block 184. Thereafter, the processing unit returns to the routine depicted in FIG. 7D so as to determine at block 194 whether the discrepancy noted in the balance keyed in by the user and the system's records has been confirmed by an authorized pharmacist. If the discrepancy was not confirmed, the processing unit will cause the display 28 to depict the incorrect balance menu at block 178. If however, the pharmacist confirms the discrepancy, the processing unit 32 will proceed to block 196 to set a discrepancy variable equal to the amount of the discrepancy i.e., the difference between the user entered balance representing the counted quantity of the drug remaining at the location and the balance on hand contained in the records of the data system 10. From block 196, the processing unit returns to block 172 to create the necessary records for the drug at blocks 172, 174 and 176 and to transmit the updated records including the discrepancy record to the host system 10 for updating the host's records for the drug.

Because the portable barcode scanning and printing system automatically prompts the user to pick a particular drug for a particular station by displaying the identity of the drug and the station identity as well at block 114, the user is lead through the picking operation very easily so as to improve accuracy of the picking and the drug tracking. Further, because the portable scanning and printing system is collecting the information entered by the user, such as the scanned drug identity data and keyboard entered quantity data, and is associating the data received from the different input means in the memory 34 with a particular pick-list record and drug or narcotics record received from the host, the system 20 can select portions of the associated data for printing labels and/or reports via the barcode printer 30. The system 20 can also automatically create and/or update different drug tracking records. By thereafter transmitting

the updated records to the host system for storage, the record keeping operation is automatically accomplished and greatly simplified so as to improve the accuracy of the drug tracking operation.

FIGS. 9A-9E illustrates a software routine executed by the portable scanning and printing system 20 to allow drugs to be picked and inventoried without receipt of a picking list from the host system and to allow drugs to be received, i.e. added to the location so as to provide a drug tracking receiving operation. The routine depicted in FIGS. 9A-E can be entered from the picking routine 91 if the No Pick-List Picking operation is selected or it may be entered from the Receiving routine 92 as shown in FIG. 4. Upon entering the routine of FIGS. 9A-E, the processing unit 32 at block 200 displays a prompt for the station i.e. the intended destination for the drug if in the No Pick List Picking mode or the source of the drug if in the Receiving mode. It is noted, that in the Receiving mode, the source of the drug can either be a wholesaler identification or, for example, a nursing station that is returning a drug. Upon receiving a station identification at block 202 from either the scanner 22 or keyboard 24, the processing unit 32 at block 204 validates the station by communicating with the host system 10 utilizing the station records 42 of the host's memory. Thereafter, if the processing unit determines at block 206 that the station information received at block 202 is valid, the processing unit proceeds to block 208. Otherwise, the processing unit returns to block 200 to prompt the user to re-enter the station identification. At block 208, the processing unit controls the display 28 to prompt the user to enter NDC data for the drug being picked or received from the barcode scanner 22, the processing unit proceeds to block 214 to validate the scanned NDC code received at block 210 by communicating with the host system 10 using the narcotics records 58 of the host system's memory. The validation by the portable scanning and printing system 20 can be accomplished by the processing unit 32 comparing NDC information received from the host's narcotics records 58 to the user entered NDC information to determine if there is a match. Alternatively, the validation by the portable scanning and printing system 20 can be accomplished by the processing unit 32 transmitting the user entered NDC data to the host system and the P.C. 12 comparing the user entered NDC data with the NDC data contained in the host's narcotics records 58. The host then transmits the result of the comparison to the portable scanning and printing system 20. Based on the information received from the host system, the processing unit 32 determines at block 216 whether the scanned or keyboard entered NDC code is valid. If it is not valid, the processing unit 32 controls the display 28 to display an error message at block 218 and returns to block 208 to again prompt for the entry of the NDC information. If the user entered NDC code is determined to be valid at block 216, the processing unit 32 proceeds to block 220.

The processing unit 32 at block 220 controls the display 28 to display a message to prompt the user to enter the quantity to be picked or the quantity to be received depending on the mode. At block 222, the processing unit 32 receives the quantity data from the keyboard 24 and thereafter displays at block 224 a prompt for the user to enter the balance remaining after the quantity of the drug entered at block 222 has been removed from the location for picking or added to the location for receiving. At block 226, the processing unit 32 receives the balance data keyed in by the user and at block 228, the processing unit 32 validates the user entered balance by communicating with the host system

**10** using the balance on hand information contained in the Narcotics record **58** of the host system's memory. As discussed above, this validation at block **228** may be implemented by the portable scanning and printing system **20** by the processing unit **32** comparing the user entered balance with the balance on hand information transmitted from the host system **10** or by the host system comparing the user entered balance as transmitted by the system **20** with the balance on hand data stored in the narcotics records **58** in which case the host transmits a message back to the portable scanning and printing system **20** with the results of the match. From block **228**, the processing unit proceeds to block **230** to determine whether the user entered balance is correct for validation. If the user entered balance is validated at block **230**, the processing unit proceeds to block **234** to write a Pick record from data stored in the memory **34** in association with the station entered at block **202**, the NDC entered at block **210**, the quantity entered at block **22** and the balance entered at **226**. This Pick record is stored in the memory **34** and block **234** and transmitted to the host system so as to update the Drug Log **175** in the host's memory. The processing unit **32** also stores an inventory record in the memory **34** at block **236** and transmits the inventory record to the host processing system for updating the Drug Log **175** in the host's memory. At block **238**, the balance on hand for the drug is updated in the memory **34** and transmitted to the host system **10** for updating the host's Narcotics records **58**. From block **238**, the processing unit proceeds to block **254** shown in FIG. 11E so as to display a menu to allow the user to pick or receive more drugs by returning to block **200** or to allow the user to exit the routine.

If the processing unit **32** does not validate the user entered balance at block **230**, the processing unit proceeds to block **240**. At block **240**, the processing unit displays an Incorrect Balance Menu on the display **28** and proceeds to block **242** to obtain the user's menu selection. One option depicted on the Incorrect Balance Menu at block **240** is to obtain pharmacist confirmation of a discrepancy which will be selected if the user determines that he has correctly counted and correctly entered the values prompted for at block **220** and **224**. If this menu choice is selected by the user, the processing unit **32** proceeds from block **242** to block **246**. At block **246**, the processing unit executes the routine depicted in FIG. 8 and thereafter proceeds to block **248** to determine whether the discrepancy has been confirmed by an authorized physician as discussed above. If the discrepancy was not confirmed, the processing unit proceeds from block **248** to block **234** and if the discrepancy was confirmed, the processing unit proceeds to block **250**. At block **250**, the processing unit writes a Discrepancy record in the memory **34** and transmits the Discrepancy record to the host system **10** so as to update the host's Discrepancy Log **251**.

If the user selects an outdated operation from the menu **88** depicted in FIG. 4, the outdated routine **93** allows the user to select either an outdated safe inventory routine or an outdated received narcotics routine. The outdated safe inventory routine allows drugs that are stored in the safe and inventoried therein to be outdated by removing the drugs from their current location within the safe to an outdated area for destruction. The outdated received narcotics routine allows drugs received from a nurse's station to be outdated without performing an inventory.

The outdated safe inventory routine is depicted in FIGS. **10A-10D**. In this routine, the processing unit **32** first obtains pharmacist confirmation at block **260** by executing the routine depicted in FIG. 8 since a pharmacist is required to handle the outdated procedure. If a pharmacist is not con-

firmed by the processing unit as determined at block **262**, the processing unit exits the routine. However, if confirmation is obtained at block **262**, the processing unit **32** proceeds to block **264** to display a message prompting the user to enter NDC data for the drug to be outdated. Upon receiving the NDC data from either the barcode scanner **22** or the keyboard **24** at block **266**, the processing unit **32** proceeds to block **268** to validate the user entered NDC data by communicating with the host system using the narcotics records **58** of the host as discussed above. If the processing unit **32** determines at block **270** that the user entered NDC information is not valid, the processing unit controls the display to depict a message to that effect at block **272** and returns back to block **264** to again prompt the user to enter the NDC information. If the processing unit **32** determines that a valid NDC code has been entered by the user, the processing unit proceeds from block **270** to block **274** to display a message to the user to prompt the user to enter the quantity of the drug to be outdated from the safe's inventory. The processing unit at block **276** receives the user entered quantity from the keyboard **24**. At block **278** the processing unit controls the display **28** to depict a message prompting the user to enter the quantity of the drug remaining after the quantity of the drug entered at block **276** has been removed from the location for outdated.

The processing unit **32** receives this user entered balance information from the keyboard **24** at block **280**. Thereafter, the processing unit **32** at block **282** validates the user entered balance by communicating with the host system using the narcotics records **58** of the host as discussed above. At block **284**, the processing unit **32** determines whether the balance is valid, i.e., whether it matches the balance on hand maintained in the host's narcotics records and if so, the processing unit proceeds to block **292**. If the user entered balance is determined to be invalid at block **284**, the processing unit proceeds to block **286** to display an Incorrect Balance Menu on the display **28** and thereafter receives the user's selection at block **288**. The Incorrect Balance Menu allows the user to acknowledge the discrepancy. If the discrepancy is acknowledged, the processing unit proceeds to block **290** to calculate a discrepancy amount, i.e. the difference between the user entered balance and the balance on hand from the host's narcotics records **58** and to assign this calculated value to a discrepancy field. At block **292**, the processing unit updates the outdated record in the memory **34** and transmits the outdated record to the host to update the host's Drug Log **175**. At block **294**, the processing unit updates the inventory record in the memory **34** and transmits the inventory record to the host system to update the drug logs **175** with the information contained therein. The host processing system also updates the balance on hand in the memory **34** at block **296** and transmits this information to the host system for updating the host's narcotics records **58**. Thereafter, an outdated record is updated in the memory **34** at block **298** and transmitted to the host **10** so as to update the expired drug log **300** maintained in the host's memory.

The Outdate Received Narcotics routine is depicted in FIGS. **11A-11B**. Upon entering this routine, the processing unit at block **302** executes the pharmacist's confirmation routine depicted in FIG. 8. Upon obtaining information that an authorized pharmacist is performing the outdated procedure as determined by the processing unit at block **304**, the processing unit **32** proceeds to block **306** to display a message on the display **28** to prompt the user to enter the station, i.e. the source, of the drug to be outdated. At block **308**, the processing unit receives the station information entered by the user via the input means and proceeds to

block 310. At block 310 the processing unit 32 validates the user entered station by communicating with the host system 10 using the host's station records 42. At block 312, the processing unit determines whether the user entered station is valid and if not, controls the display 28 to depict an error message 314. From block 314, the processing unit returns to block 306. If the user entered station is determined to be valid at block 312, the processing unit proceeds to block 315 to control the display 28 to depict a message prompting the user to enter NDC data for the drug to be outdated from the identified station. At block 316, the processing unit receives the user entered NDC data and at block 318 validates the user entered data by communicating with the host system using the host's narcotics records 58. At block 320, the processing unit determines whether the user entered NDC information is valid and if not the processing unit controls the display 28 at block 324 to display an error message and the processing unit returns to block 315. If the processing unit determines at block 320 that the user entered NDC information is valid, the processing unit at block 326 controls the display 328 to depict a message to prompt the user to enter the quantity of the drug to be outdated. Thereafter, at block 328, the processing unit receives the user entered quantity. At block 330 the processing unit updates an outdated record in the memory 34 and transmits the outdated record to the host system 10 to update the Expired Drug Log record 300 in the host's memory.

If a user selects the inventory operation from the main menu displayed at block 88, at block 94 of FIG. 4, the processing unit 32 executes the routine depicted in FIGS. 12A-12C. This routine allows an inventory operation to be performed independent of picking, receiving and outdated. Upon entering the inventory routine at block 332, the processing unit 32 controls the display 28 to depict a message to prompt the user to enter NDC information. At block 334 the processing unit receives the entered NDC information from the input means used. The processing unit 32 then validates at block 336 the user entered NDC data by communicating with the host system 10 using the host's narcotics records 58. If the processing unit 32 determines at block 338 that the user entered NDC information is not valid in that it does not match a NDC code contained within the host's narcotics records 58, the processing unit proceeds to block 340 to control the display 28 to depict an error message. Thereafter, the processing unit proceeds to block 332 from block 340. If the user entered NDC data is determined to be valid at block 338 the processing unit at block 342 prompts the user to enter a balance value representing a quantity of the drug currently maintained at the location. At block 342, the processing unit receives the user entered balance data and proceeds to block 344. At block 344, the processing unit 32 validates the user entered balance by communicating with the host system 10 using the host's systems narcotics records 58. At block 346, the processing unit determines whether the user entered balance is valid and if so, the processing unit proceeds to block 348. At block 348, the processing unit updates an inventory record in the memory 34 and transmits the inventory record to the host system 10 so as to update the Drug Log 175 of the host's memory. At block 350, the processing unit updates the balance on hand data in the memory 34 and transmits the balance on hand information to the host system 10 so as to update the host's narcotics records 58. Thereafter, the processing unit proceeds to block 352 to display a menu to the user which allows the user to select an option to exit the routine or to select an option to inventory another drug maintained at the location. If the latter option is selected by

the user, the processing unit proceeds from block 354 to block 332 to prompt the user to enter the NDC information associated with the next drug to be inventoried.

If the processing unit 32 determines at block 346 that the user entered balance is not valid, the processing unit proceeds from block 346 to block 356. At block 356, the processing unit controls the display 28 to depict an Incorrect Balance Menu. This menu allows the user to obtain pharmacist confirmation of a discrepancy. The processing unit proceeds from block 358 to block 360. At block 360, the processing unit obtains pharmacist confirmation by executing the routine depicted in FIG. 8. At block 362, the processing unit determines whether a pharmacist has confirmed the discrepancy and if not, the processing unit returns to block 356. If the discrepancy is confirmed as determined at block 362, the processing unit proceeds to block 364. At block 364 the processing unit updates a discrepancy record in the memory 34 and transmits the discrepancy record to the host system 10 via the communication interface 26 to update the Discrepancy Log maintained at the host system. Thereafter, at block 364, the processing unit marks an inventory record discrepancy flag associated with the inventoried drug in the memory 34 and proceeds from block 366 to block 348.

Many modifications and variations of the present invention are possible in light of the above teachings. For example, the drug tracking method of the present invention can be used at locations other than a drug safe including the nursing stations and any other source and/or destination of a drug. Further as noted above, the processing unit 32 may include one or more microprocessors. If multiple microprocessors or the like are employed, the above-described operations could be performed by any one or combination of the processors. For example, one processor could control scanning operations, another processor could control data collection operations and another processor might control printing operations as will be readily apparent to one of ordinary skill in the art. Because validation of user entered data, whether via the scanner 22 or keyboard 24, is performed automatically and non-validation results in a displayed prompt to the user to correct or confirm a discrepancy before proceeding, the user is forced to deal with the discrepancy immediately, when counting errors and data entry errors are most easily corrected. Thus, the system and method of the present invention increases the accuracy of the drug tracking operation. Thus, it is to be understood that, within the scope of the appended claims, the invention may be practiced otherwise than as described hereinabove.

What is claimed and desired to be secured by Letters Patent is:

1. A method of operating a portable scanning and printing system for tracking drugs maintained at a location, the portable scanning and printing system having a memory for collecting data, a display, a barcode printer and a plurality of input means including a barcode scanner, a keyboard and a wireless communication interface to allow wireless communication with a host system having a memory for storing drug tracking records, comprising:

receiving user identification information from one of the input means;  
 receiving from the scanner scanned barcode data representing the identity of a drug maintained at the location;  
 receiving from the keyboard data confirming a quantity of the drug being removed or added;  
 associating in the portable scanning and printing system memory, data received from a plurality of the input means for a drug;

transmitting to the host system via the communication interface information regarding the removal of the drug from the location or the addition of the drug to the location, including the user's identification, the identity of the drug and the quantity of the drug being removed or added;

receiving from the keyboard user entered balance data representing a quantity of the drug remaining at the location after the removal or addition of a quantity of the drug;

validating the user entered balance; and

prompting the user via the display to select a displayed option for dealing with a discrepancy if the user entered balance is not validated including an option to obtain confirmation of a discrepancy by an authorized person.

**2.** A method of operating a portable scanning and printing system for tracking drugs as recited in claim 1 wherein said step of validating includes comparing a stored balance for the identified drug to the user entered balance to determine whether there is a match.

**3.** A method of operating a portable scanning and printing system for tracking drugs as recited in claim 2 including the step of receiving data from the host system via the wireless communication interface representing a balance for the drug and storing the received balance in association with the drug identity.

**4.** A method of operating a portable scanning and printing system for tracking drugs as recited in claim 3 including the step of automatically updating the stored balance by subtracting a confirmed quantity of a drug being removed from the stored balance to provide a new balance that is stored or by adding a confirmed quantity of a drug being added to the stored balance to provide a new balance that is stored.

**5.** A method of operating a portable scanning and printing system for tracking drugs as recited in claim 1 including the step of transmitting a validated user entered balance to the host system.

**6.** A method of operating a portable scanning and printing system for tracking drugs as recited in claim 1 wherein the step of validating includes transmitting a user entered balance to the host system for comparison to a balance stored in the host system for the drug to determine whether there is a match and receiving from the host system a result of the host system's comparison.

**7.** A method of operating a portable scanning and printing system for tracking drugs as recited in claim 1 wherein the step of prompting the user to deal with the discrepancy includes displaying a message to the user with a selectable option to re-enter the user entered balance.

**8.** A method of operating a portable scanning and printing system for tracking drugs as recited in claim 1 wherein the step of prompting the user to deal with the discrepancy includes displaying a message to the user with a selectable option to re-enter the quantity of the drug being removed or added.

**9.** A method of operating a portable scanning and printing system for tracking drugs as recited in claim 1 including the step of generating a record of a discrepancy upon confirmation of the discrepancy by an authorized person; and transmitting a discrepancy record to the host upon confirmation.

**10.** A method of operating a portable scanning and printing system for tracking drugs as recited in claim 1 including the step of printing information on a label including a barcode identifying the drug being removed or added.

**11.** A method of operating a portable scanning and printing system for tracking drugs as recited in claim 10 includ-

ing the step of receiving information identifying a source of a drug being added or a destination of a drug being removed and wherein the step of printing includes printing information including the source or destination of a drug.

**12.** A method of operating a portable scanning and printing system for tracking drugs as recited in claim 1 including the steps of

receiving from the host system via the communication interface information identifying a drug to be removed from the location, a quantity of the drug to be removed and an intended destination;

displaying information to the user to prompt the user to select a drug identified by information received from the host system;

receiving from the scanner scanned barcode data representing the identity of a drug maintained at the location; comparing the identity of the drug represented by the scanned barcode data to the identity of the drug received from the host system; and

displaying an error message to the user if the identity of the drug represented by the scanned barcode does not match the identity of the drug received from the host system.

**13.** A method of operating a portable scanning and printing system for tracking drugs maintained at a location, the portable scanning and printing system having a memory for collecting data, a display, a barcode printer and a plurality of input means including a barcode scanner, a keypad and a wireless communication interface to allow wireless communication with a host system having a memory for storing drug tracking records, comprising:

displaying a message to a user on the display to prompt the user to enter an identity of a drug maintained at the location;

receiving user entered drug identity data;

displaying a message to a user on the display to prompt the user to enter a quantity of the drug to be added to or removed from the locations;

receiving user entered data representing the quantity of the drug being added to or removed from the location; displaying a message to a user on the display to prompt the user to enter a balance representing the quantity of the drug being maintained at the location after the addition or removal of the drug;

validating the user entered balance; and

prompting the user via the display to select a displayed option from dealing with a discrepancy if the user entered balance is not valid including an option to obtain confirmation of a discrepancy by an authorized person.

**14.** A method of operating a portable scanning and printing system for tracking drugs as recited in claim 13 including the step of transmitting to the host system via the wireless communication interface selected data received from said input means in association with the entered identity of the drug.

**15.** A method of operating a portable scanning and printing system for tracking drugs as recited in claim 13 wherein said step of validating includes comparing a stored balance for the identified drug to the user entered balance to determine whether there is a match.

**16.** A method of operating a portable scanning and printing system for tracking drugs as recited in claim 15 including the step of receiving data from the host system via the wireless communication interface representing a balance for

the drug and storing the received balance in association with the drug identity.

**17.** A method of operating a portable scanning and printing system for tracking drugs as recited in claim **16** including the step of automatically updating the stored balance by subtracting a confirmed quantity of a drug being removed from the stored balance to provide a new balance that is stored or by adding a confirmed quantity of a drug being added to the stored balance to provide a new balance that is stored.

**18.** A method of operating a portable scanning and printing system for tracking drugs as recited in claim **13** including the step of transmitting a validated user entered balance to the host system.

**19.** A method of operating a portable scanning and printing system for tracking drugs as recited in claim **13** wherein the step of validating includes transmitting a user entered balance to the host system for comparison to a balance stored in the host system for the drug to determine whether there is a match and receiving from the host system a result of the host system's comparison.

**20.** A method of operating a portable scanning and printing system for tracking drugs as recited in claim **13** wherein the step of prompting the user to deal with the discrepancy includes displaying a message to the user to obtain a pharmacist's confirmation.

**21.** A method of operating a portable scanning and printing system for tracking drugs as recited in claim **13** wherein the step of prompting the user to deal with the discrepancy includes displaying a message to the user to prompt re-enter of information.

**22.** A method of operating a portable scanning and printing system for tracking drugs as recited in claim **13** wherein the step of prompting the user to deal with the discrepancy includes displaying a message to the user with a selectable option to obtain confirmation of the discrepancy by an authorized person.

**23.** A method of operating a portable scanning and printing system for tracking drugs as recited in claim **13** including the step of printing information on a label including a barcode identifying the drug being removed or added.

**24.** A method of operating a portable scanning and printing system for tracking drugs as recited in claim **23** including the step of receiving information identifying a source of a drug being added or a destination of a drug being removed and wherein the step of printing includes printing information including the source or destination of a drug.

**25.** A method of operating a portable scanning and printing system for tracking drugs as recited in claim **13** including the steps of

receiving from the host system via the communication interface information identifying a drug to be removed from the location, a quantity of the drug to be removed and an intended destination;

displaying information to the user to prompt the user to select a drug identified by information received from the host system;

receiving from the scanner scanned barcode data representing the identity of a drug maintained at the location; comparing the identity of the drug represented by the scanned barcode data to the identity of the drug received from the host system; and

displaying an error message to the user if the identity of the drug represented by the scanned barcode does not match the identity of the drug received from the host system.

**26.** A method of operating a portable scanning and printing system for tracking drugs maintained at a location, the portable scanning and printing system having a memory for collecting data, a display, a barcode printer and a plurality of input means including a barcode scanner, a keypad and a wireless communication interface to allow wireless communication with a host system having a memory for storing drug tracking records comprising:

10 receiving from the host system via the communication interface information identifying a drug to be removed from the location, a quantity of the drug to be removed and an intended destination;

displaying information to the user to prompt the user to select a drug identified by information received from the host system;

receiving from the scanner scanned barcode data representing the identity of a drug maintained at the location; comparing the identity of the drug represented by the scanned barcode data to the identity of the drug received from the host system; and

displaying an error message to the user if the identity of the drug represented by the scanned barcode does not match the identity of the drug received from the host system.

**27.** A method of operating a portable scanning and printing system for tracking drugs maintained at a location as recited in claim **26** including the step of printing information on at least one label for the drug being removed, the printed information including the identity of the drug and the intended destination.

**28.** A method of operating a portable scanning and printing system for tracking drugs maintained at a location as recited in claim **26** including the steps of

receiving user identification information from one of the input means;

receiving information from the keyboard confirming a quantity of the drug being removed; and

transmitting to the host station via the communication interface information regarding the removal of the drug from the location including the user's identification, the identity of the drug and the quantity of the drug being removed.

**29.** A method of operating a portable scanning and printing system for tracking drugs maintained at a location as recited in claim **28** including the steps of

receiving from the keyboard user entered balance data representing a quantity of the drug remaining at the location;

receiving from the host system via the communication interface data representing a balance of the drug stored in the host system's drug tracking records; and validating the user entered balance data with information received from the host.

**30.** A method of operating a portable scanning and printing system for tracking drugs as recited in claim **29** wherein the validating step includes comparing the balance data received from the host with the user entered balance data.

**31.** A method of operating a portable scanning and printing system for tracking drugs as recited in claim **29** wherein the validating step includes updating the balance data received from the host to account for a received confirmed quantity of the drug being removed; and comparing the balance data received from the host with the user entered balance data.

**32.** A method of operating a portable scanning and printing system for tracking drugs maintained at a location, the

portable scanning and printing system having a memory for collecting data, a display, a barcode printer and a plurality of input means including a barcode scanner, a keypad and a wireless communication interface to allow wireless communication with a host system having a memory for storing drug tracking records comprising:

- receiving from the scanner scanned barcode data representing the identity of a drug maintained at the location;
- receiving from the keyboard data confirming a quantity of the drug being added to the location or removed from the location;
- transmitting to the host system via the communication interface information regarding a drug's addition to or removal from the location including the identity of the drug and the quantity of the drug being added to or removed from the location;
- receiving from the keyboard user entered balance data confirming a quantity of the drug maintained at the location after the drugs addition to or removal from the location; and
- validating the user entered balance data by communicating with the host system; and
- prompting the user to obtain confirmation of a discrepancy if the user entered balance is not valid.

**33.** A method of operating a portable scanning and printing system for tracking drugs as recited in claim 32 wherein said step of validating includes comparing a stored balance for the identified drug to the user entered balance to determine whether there is a match.

**34.** A method of operating a portable scanning and printing system for tracking drugs as recited in claim 33 including the step of receiving data from the host system via the wireless communication interface representing a balance for the drug and storing the received balance in association with the drug identity.

**35.** A method of operating a portable scanning and printing system for tracking drugs as recited in claim 34 including the step of automatically updating the stored balance by subtracting a confirmed quantity of a drug being removed from the stored balance to provide a new balance that is stored or by adding a confirmed quantity of a drug being added to the stored balance to provide a new balance that is stored.

**36.** A method of operating a portable scanning and printing system for tracking drugs as recited in claim 32 including the step of transmitting a validated user entered balance to the host system.

**37.** A method of operating a portable scanning and printing system for tracking drugs as recited in claim 32 wherein the step of validating includes transmitting a user entered balance to the host system for comparison to a balance stored in the host system for the drug to determine whether there is a match and receiving from the host system a result of the host system's comparison.

**38.** A method of operating a portable scanning and printing system for tracking drugs as recited in claim 32 wherein the step of prompting the user to includes displaying a message to the user with a selectable option to re-enter the user entered balance.

**39.** A method of operating a portable scanning and printing system for tracking drugs as recited in claim 32 wherein the step of prompting the user to includes displaying a message to the user with a selectable option to re-enter the quantity of the drug being removed or added.

**40.** A method of operating a portable scanning and printing system for tracking drugs as recited in claim 32 including the step of generating a record of a discrepancy upon confirmation of the discrepancy by an authorized person; and transmitting a discrepancy record to the host upon confirmation.

**41.** A method of operating a portable scanning and printing system for tracking drugs as recited in claim 32 including the step of printing information on a label including a barcode identifying the drug being removed or added.

**42.** A method of operating a portable scanning and printing system for tracking drugs as recited in claim 32 including the step of receiving information identifying a source of a drug being added or a destination of a drug being removed and wherein the step of printing includes printing information including the source or destination of a drug.

**43.** A method of operating a portable scanning and printing system for tracking drugs maintained at a location, the portable scanning and printing system having a memory for collecting data, a display, a printer and a plurality of input means including a barcode scanner, a keyboard and a wireless communication interface to allow wireless communication with a host system having a memory for storing drug tracking records comprising:

- receiving from the scanner scanned barcode data representing the identity of a drug maintained at the location;
- transmitting to the host system data representing the identity of the drug received from the scanner;
- receiving information from the host system representing the validity of the identity of the drug transmitted to the host;
- receiving from the keyboard data representing a quantity of the drug maintained at the location;
- receiving from the host system data representing the balance of the drug that the host's data tracking records indicate should be remaining at the location;
- comparing the quantity of the drug maintained at the location as received from the keyboard and the balance received from the host to determine if they match; and
- displaying a selectable option to the user to allow a confirmation of a discrepancy by an authorized person if the comparison results in a no match determination.



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(12) **United States Patent**  
Janning et al.(10) Patent No.: **US 6,446,049 B1**  
(45) Date of Patent: **Sep. 3, 2002**(54) **METHOD AND APPARATUS FOR  
TRANSMITTING A DIGITAL INFORMATION  
SIGNAL AND VENDING SYSTEM  
INCORPORATING SAME**(75) Inventors: **Joseph J. Janning**, West Chester;  
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OH (US)(\*) Notice: Subject to any disclaimer, the term of this  
patent is extended or adjusted under 35  
U.S.C. 154(b) by 0 days.(21) Appl. No.: **09/162,748**(22) Filed: **Sep. 29, 1998****Related U.S. Application Data**(63) Continuation-in-part of application No. 08/956,732, filed on  
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1997, and provisional application No. 60/029,464, filed on  
Oct. 25, 1996.(51) Int. Cl.<sup>7</sup> ..... **G06F 17/60**(52) U.S. Cl. ..... **705/40; 141/94; 700/231**(58) Field of Search ..... 700/231; 141/94;  
235/381, 383; 705/40, 77, 34(56) **References Cited**

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Primary Examiner—F. J. Bartuska

(74) Attorney, Agent, or Firm—Holland &amp; Knight LLP

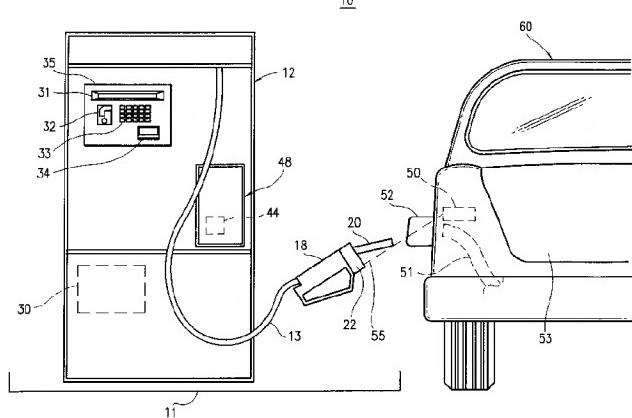
(57) **ABSTRACT**

A cashless business transaction system (e.g., a vending system, a material tracking system, or a highway toll system) incorporates a method and apparatus for transmitting a digital information signal. A signal generator (311) generates a constant frequency signal. A phase modulator (305) varies the instantaneous phase of the constant frequency signal to represent digital information, thereby producing a phase modulated signal (325). A tuned resonant circuit (307) filters and averages the phase modulated signal to produce a simulated FM signal, and transmits the simulated FM signal via its antenna (309). One such business transaction system (e.g., a vending system) incorporates such a transmitter to facilitate transmission of billing information from a device located within a substantially electrically shielded environment. Another such business transaction system preferably incorporates such a transmitter to facilitate half-duplex transmission of digital information regardless of whether or not the digital information is transmitted from a device located within a substantially electrically shielded environment.

**37 Claims, 14 Drawing Sheets**

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(1 Microfiche, 82 Pages)



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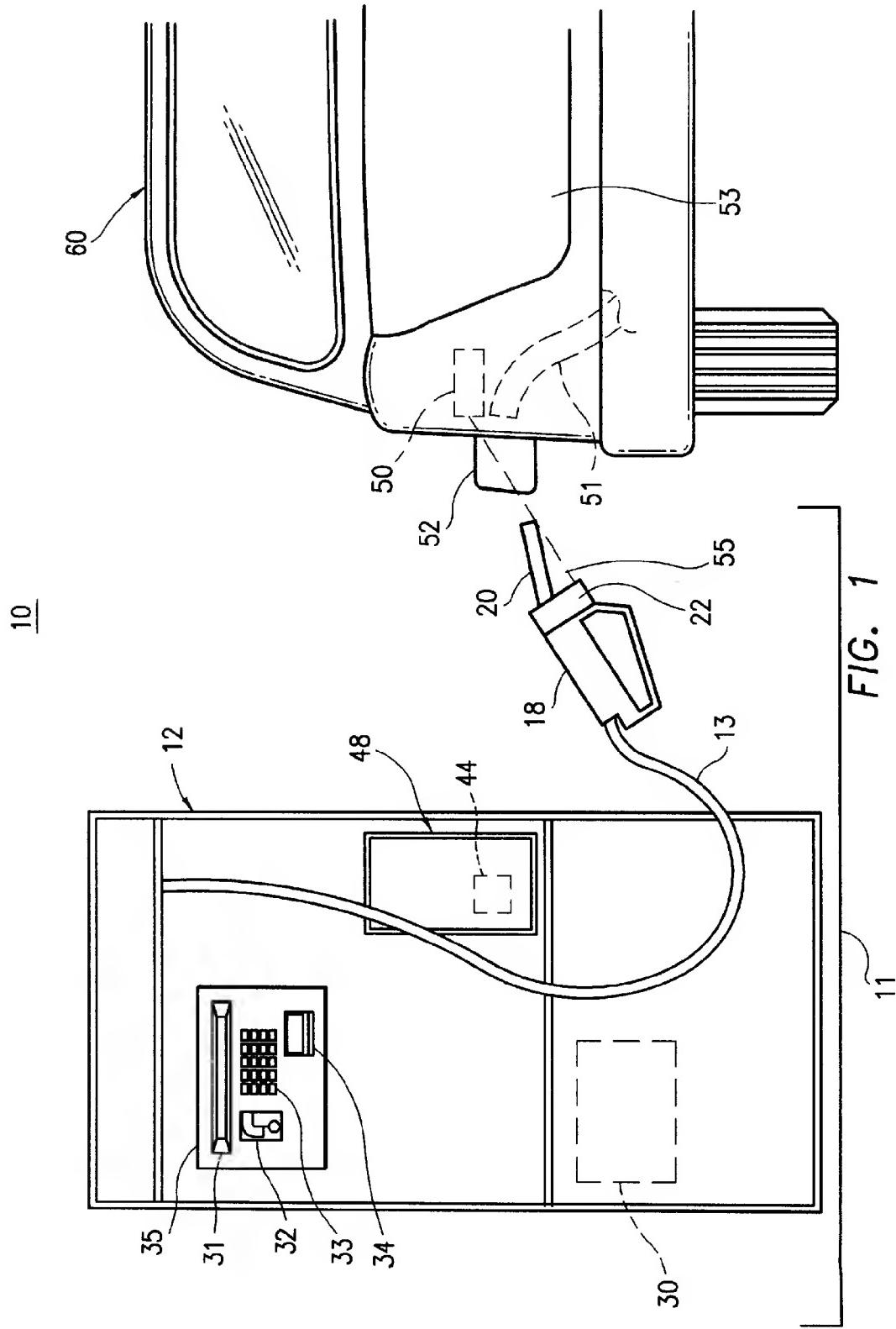
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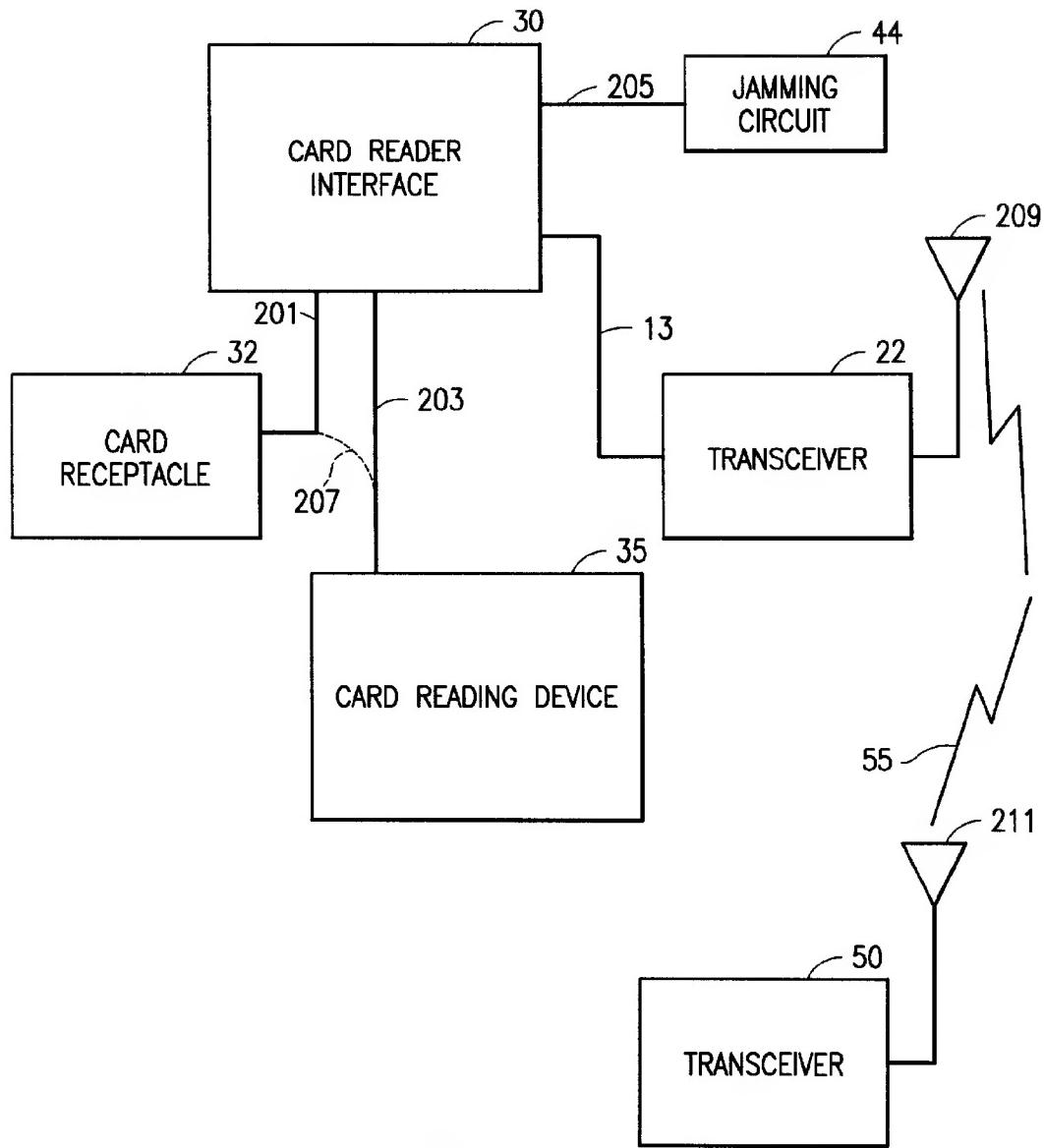
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FIG. 2

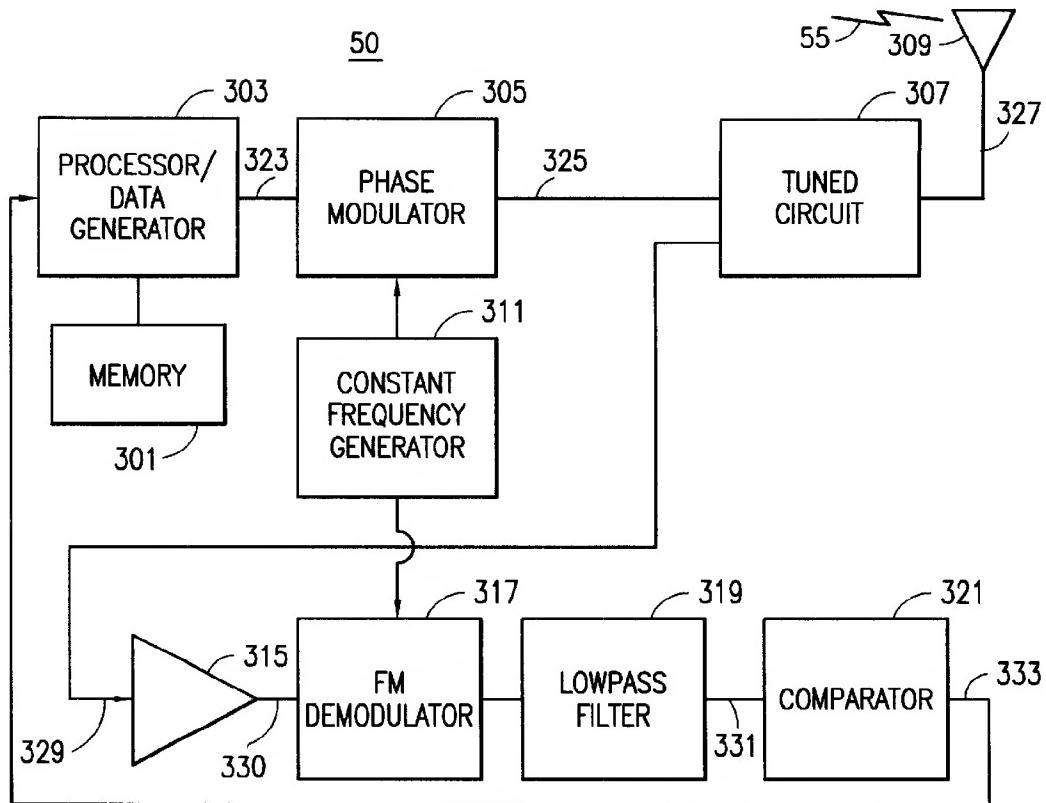


FIG. 3

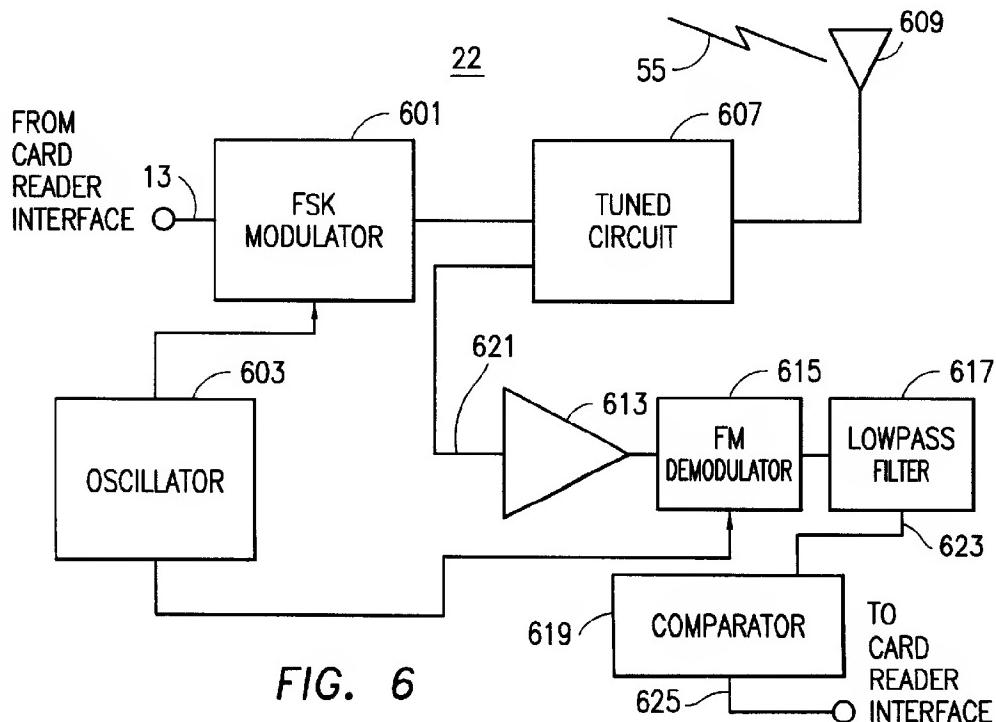


FIG. 6

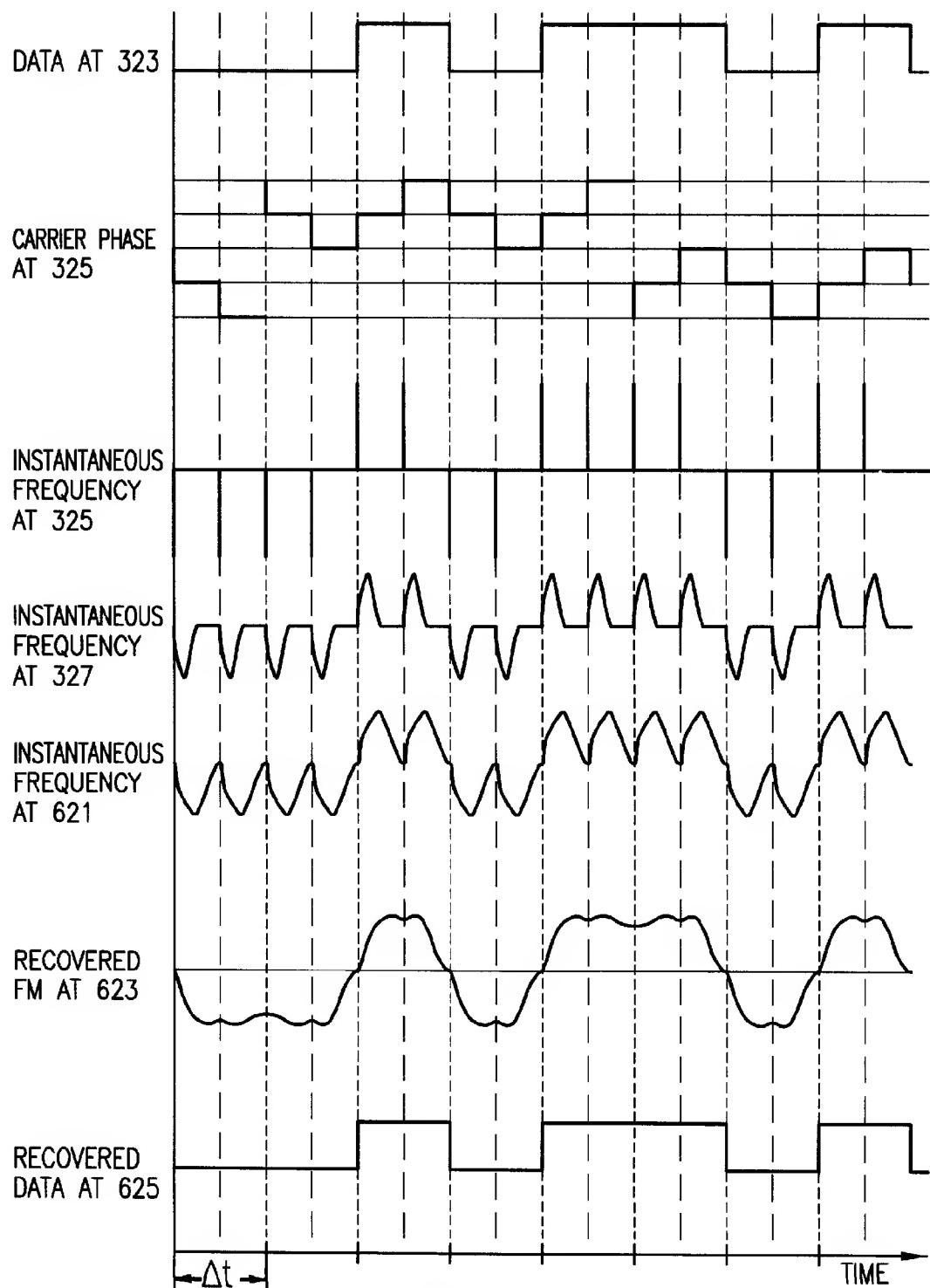
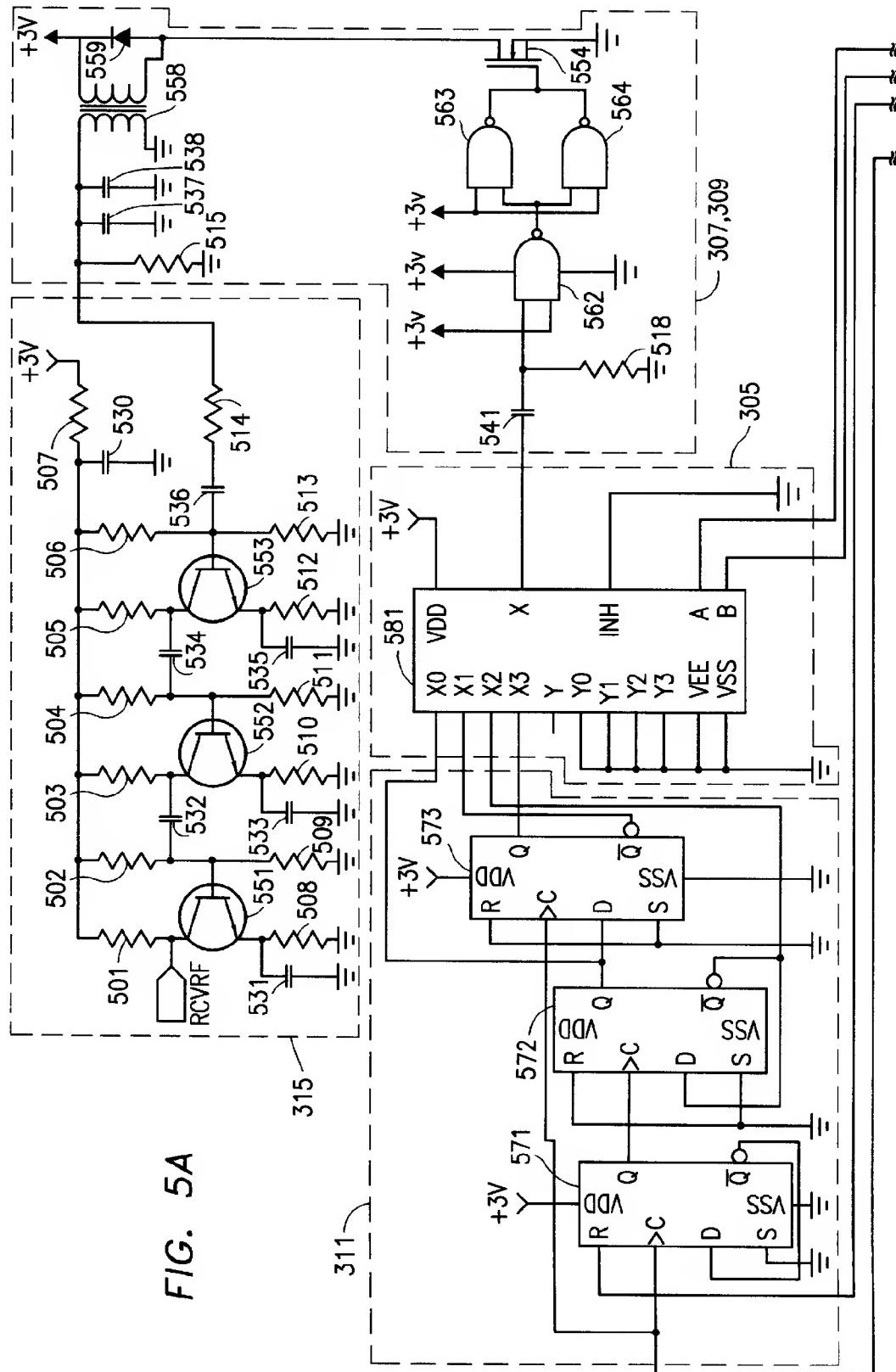


FIG. 4



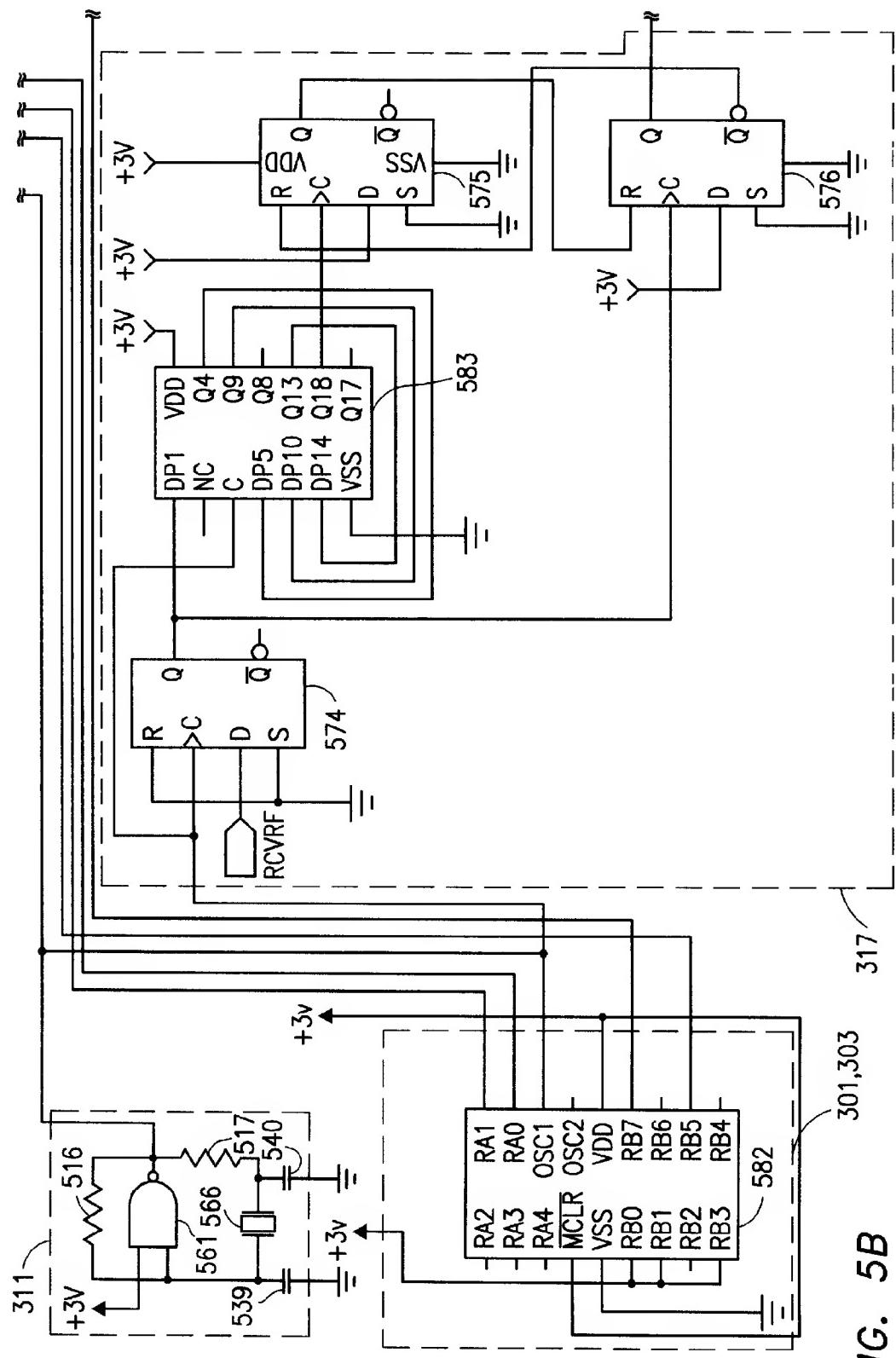


FIG. 5B

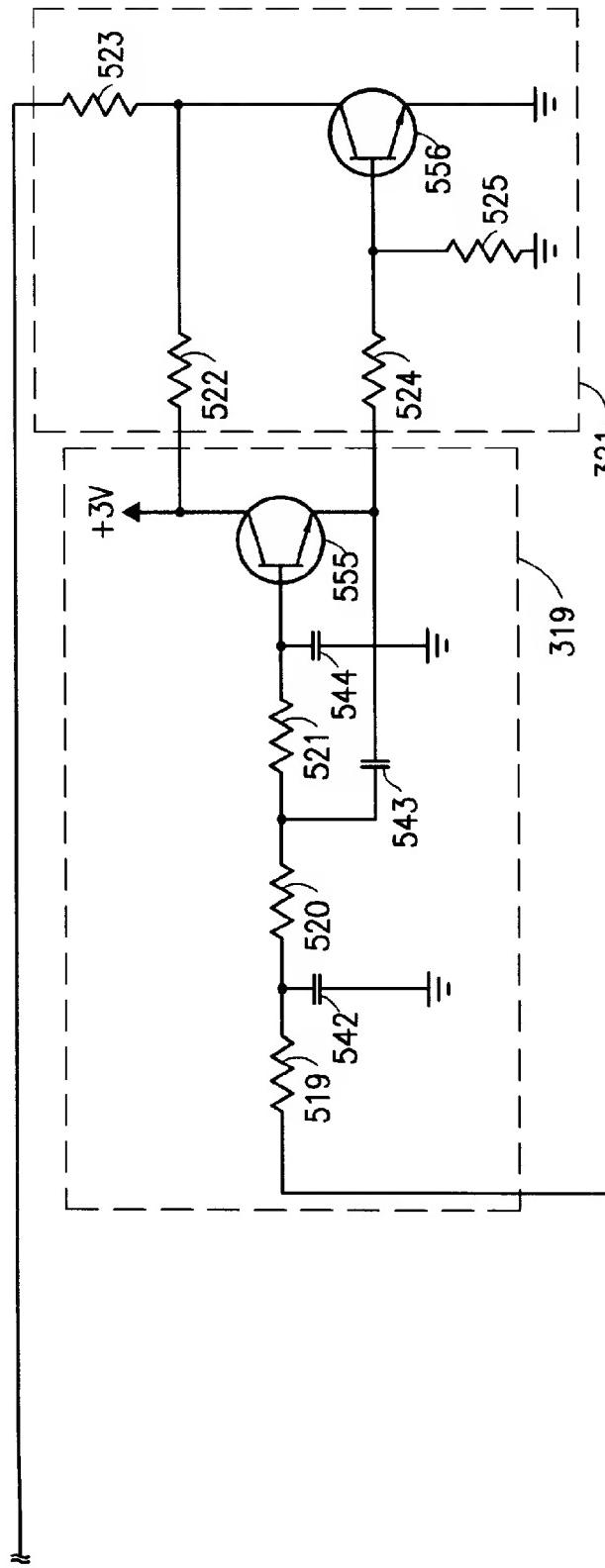


FIG. 5C



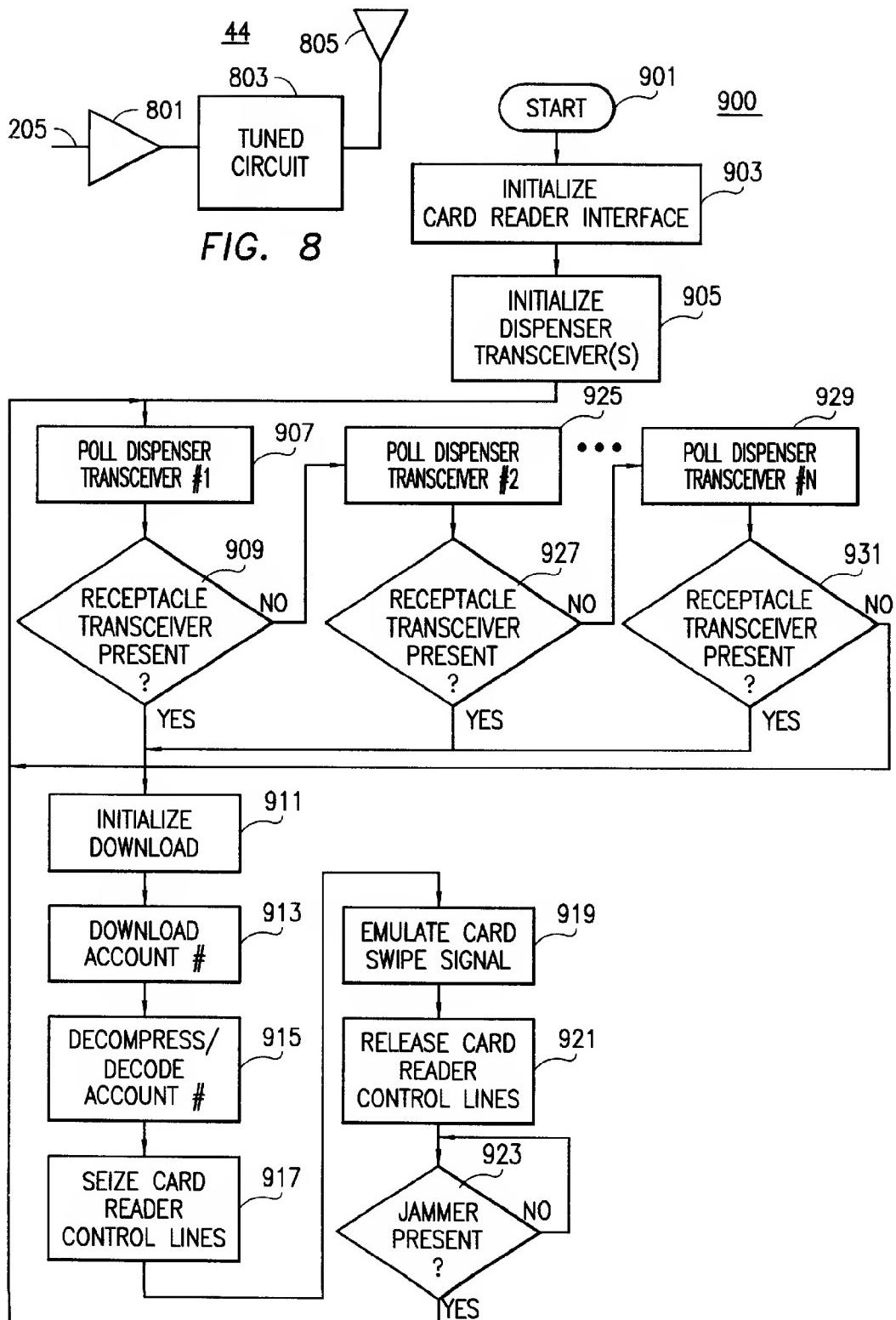
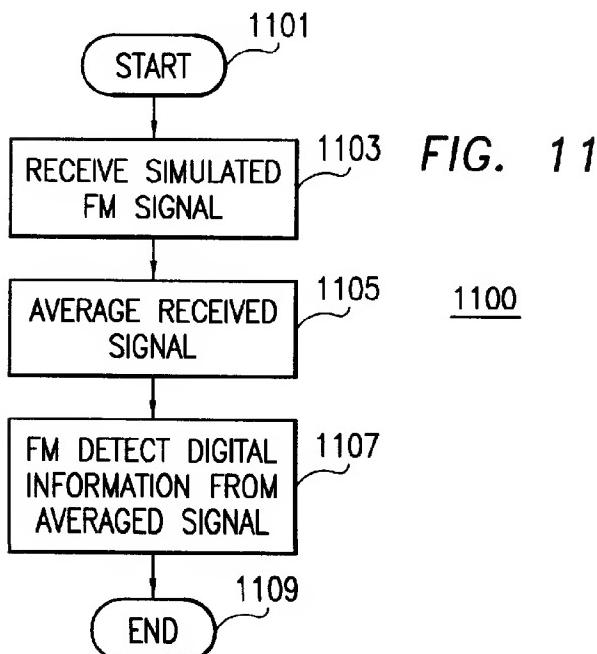
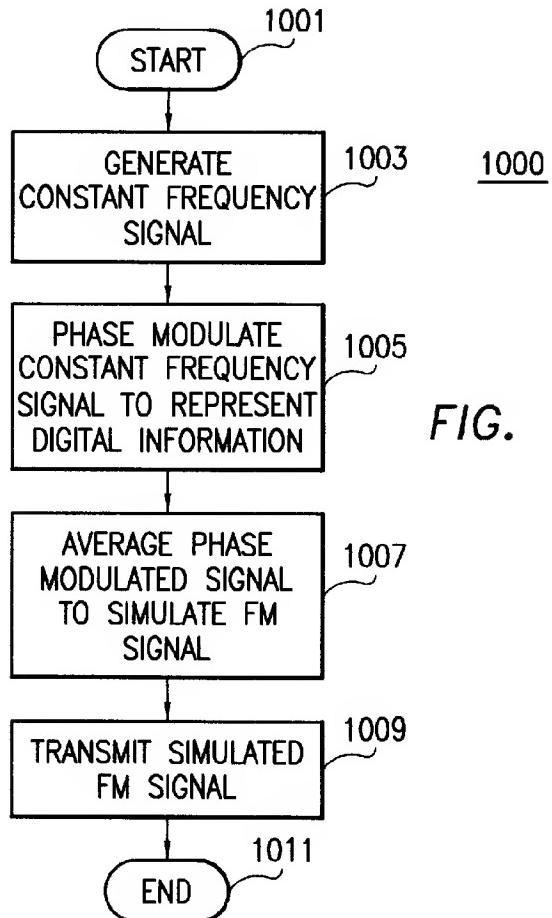


FIG. 9



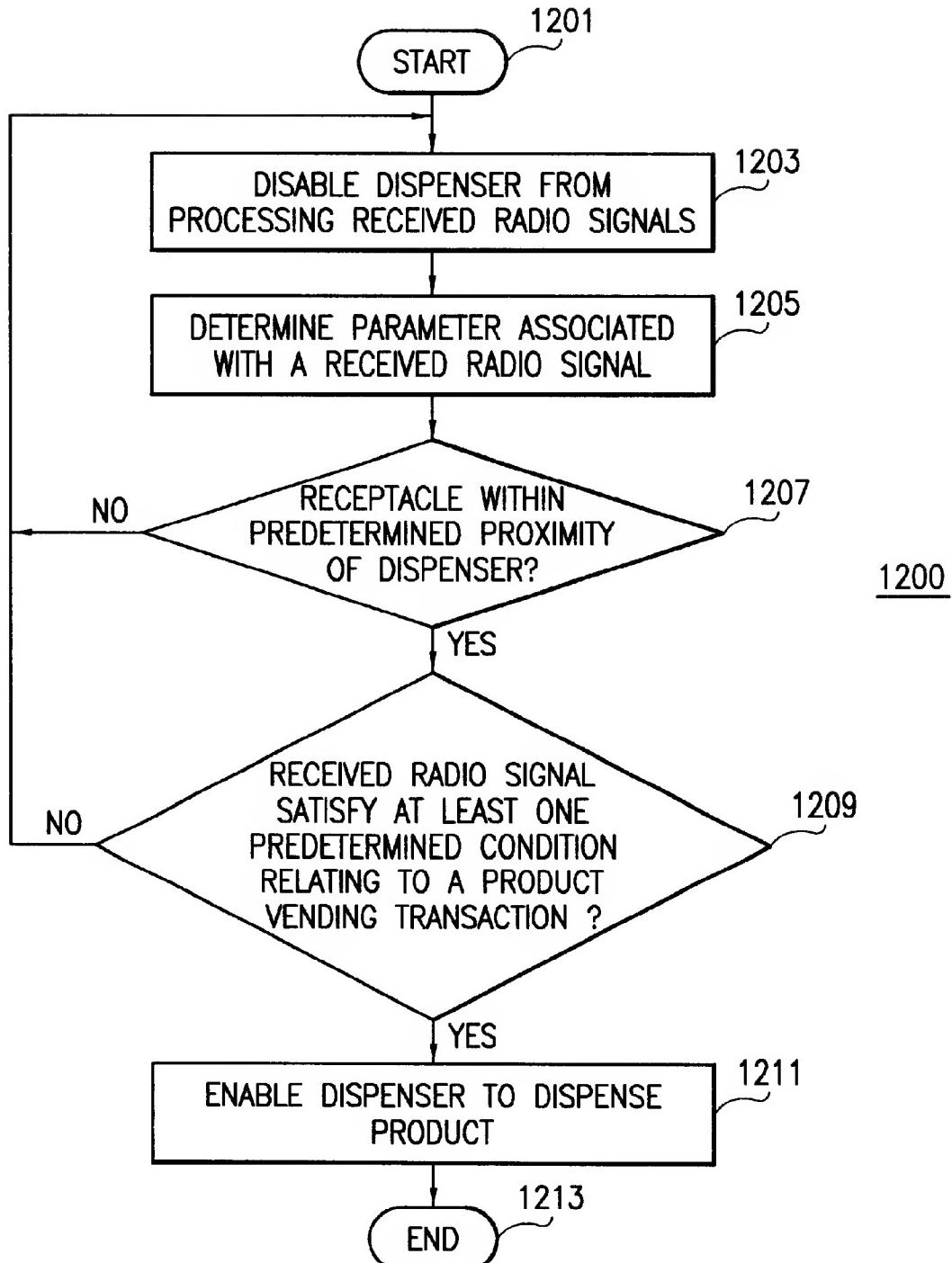


FIG. 12

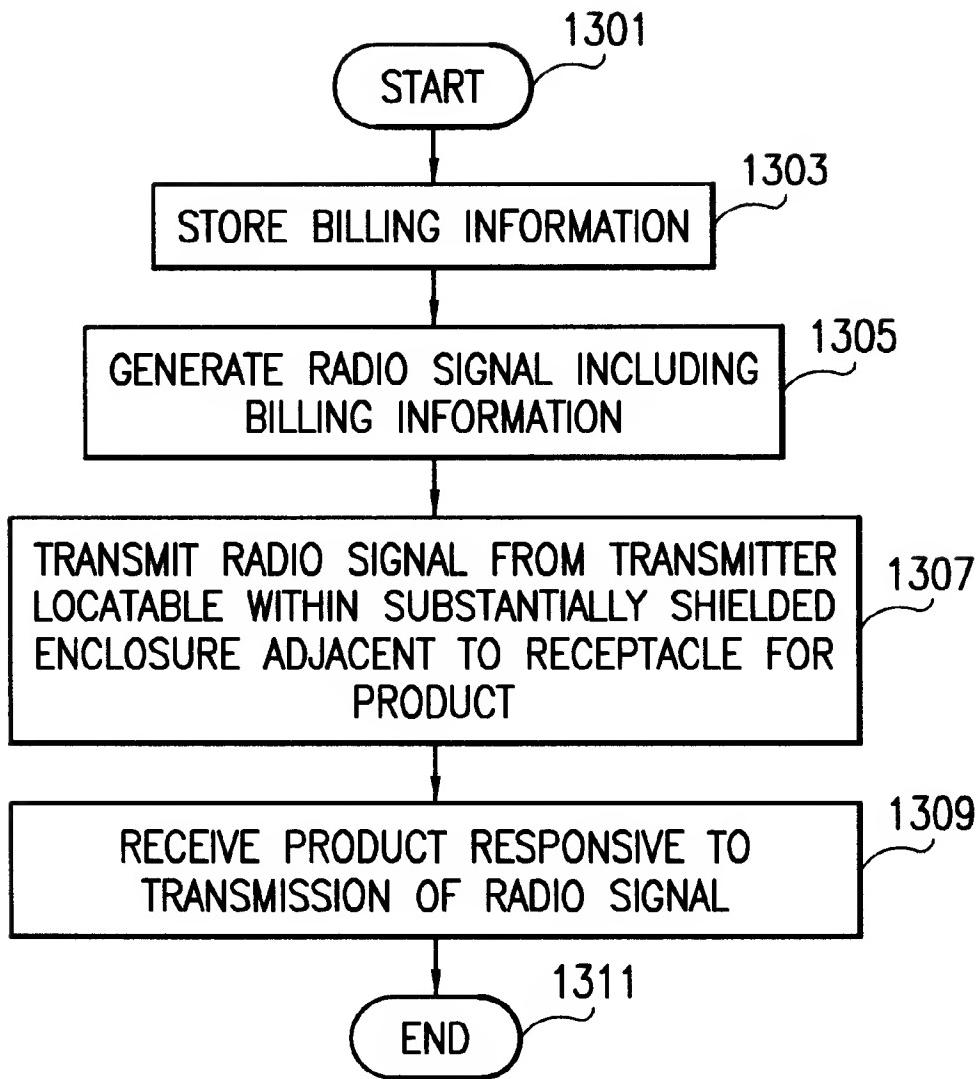
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FIG. 13

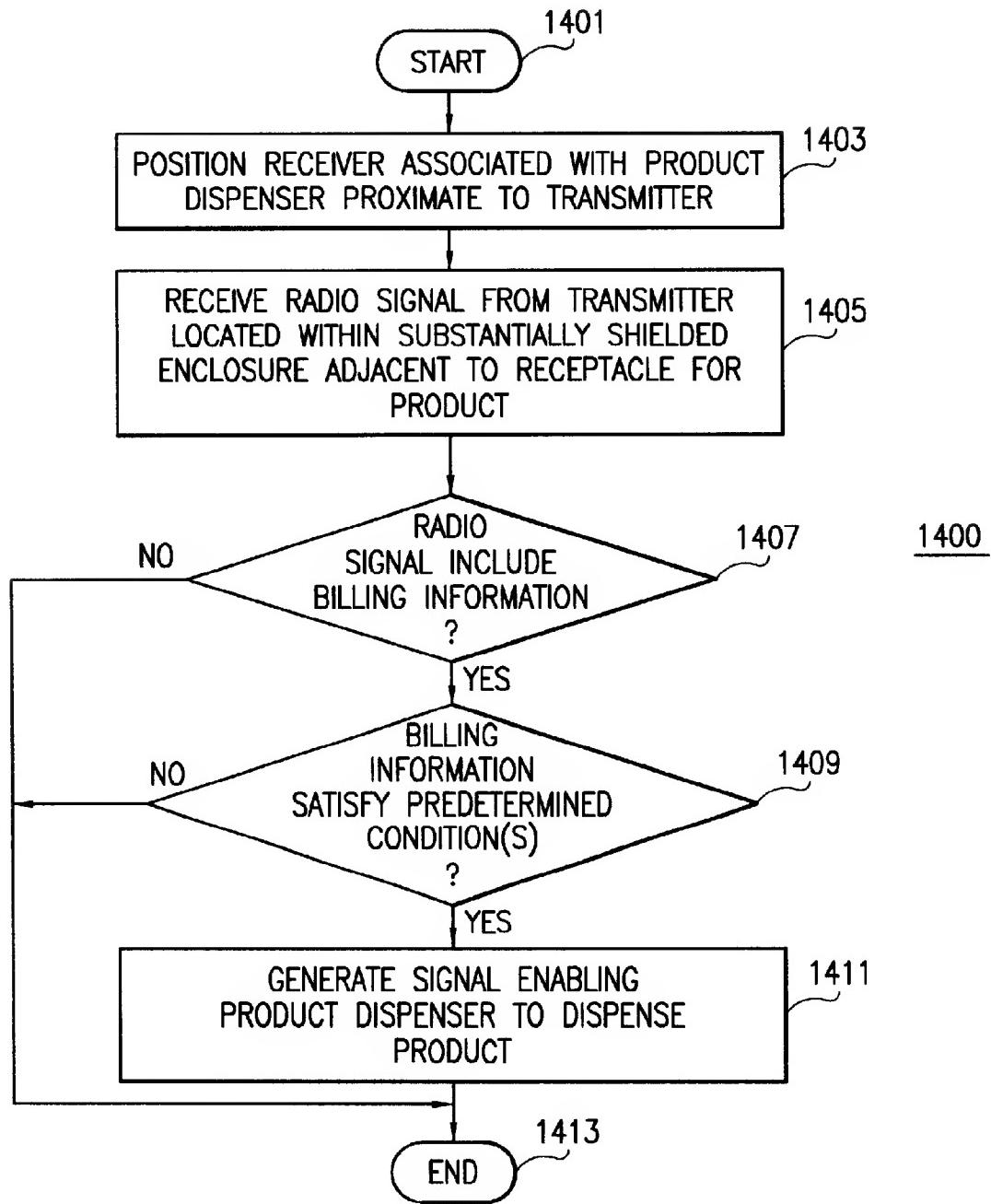
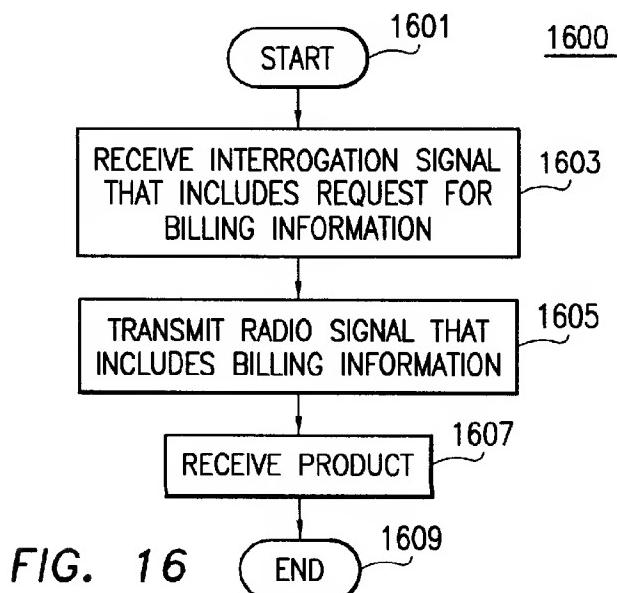
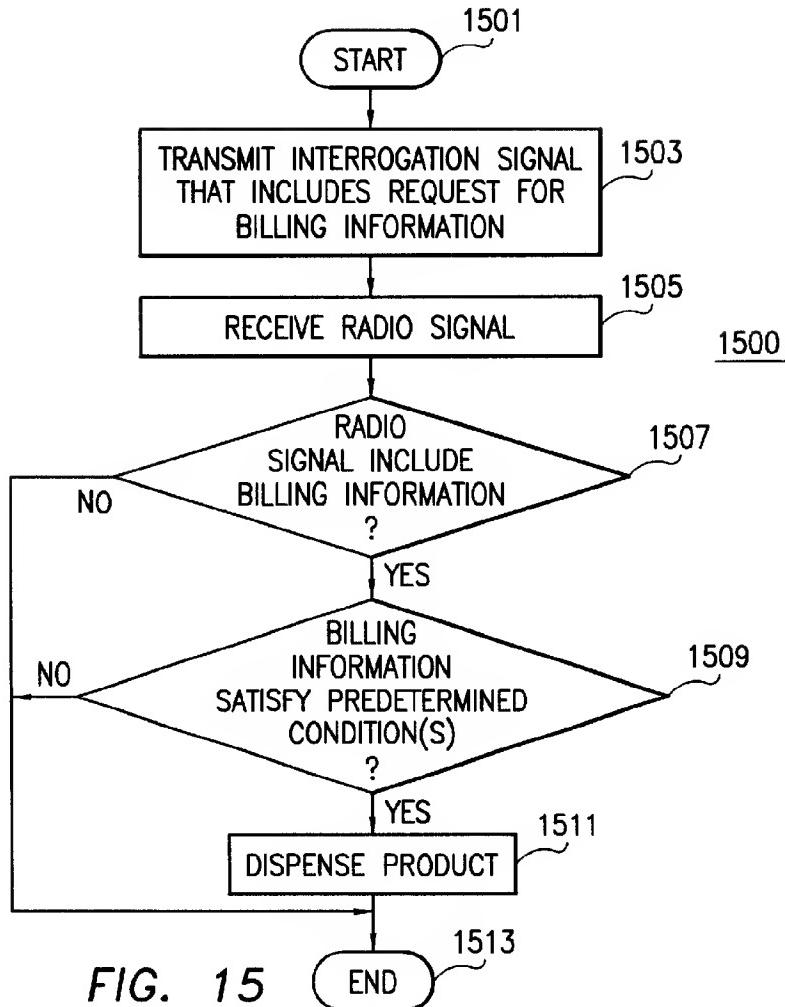


FIG. 14



**METHOD AND APPARATUS FOR  
TRANSMITTING A DIGITAL INFORMATION  
SIGNAL AND VENDING SYSTEM  
INCORPORATING SAME**

**CROSS REFERENCE TO RELATED  
APPLICATIONS**

This application is a continuation-in-part of commonly-assigned U.S. patent application Ser. No. 08/956,732, filed Oct. 23, 1997, now U.S. Pat. No. 6,064,308 issued May 16, 2000 and claims benefit of Provisional Appl No. 60/029,464 filed Oct. 25, 1996 and No. 60/060,390 filed Sep. 29, 1997. A portion of the disclosure of this patent document contains material which is subject to copyright protection. The copyright owner has no objection to the facsimile reproduction by anyone of the patent document or the patent disclosure, as it appears in the Patent and Trademark Office patent file or records, but otherwise reserves all copyright rights whatsoever.

Priority under 35 U.S.C. §119(e) is hereby claimed to co-pending, commonly-assigned U.S. Provisional Application No. 60/060,370, filed Sep. 29, 1997 and entitled "Apparatus and Method for Transmitting an Encoded Signal Through a Metallic Surface and Vending System Incorporating Same", which is expressly incorporated herein by reference in its entirety to form part of the present disclosure.

**REFERENCE TO MICROFICHE APPENDIX**

A portion of the disclosure of this patent document contains material which is subject to copyright protection. The copyright owner has no objection to the facsimile reproduction by anyone of the patent document or the patent disclosure, as it appears in the Patent and Trademark Office patent file or records, but otherwise reserves all copyright rights whatsoever.

This disclosure includes a Microfiche Appendix containing computer program listings consisting in total of one (1) sheet of microfiche including eighty-two (82) total frames which are expressly incorporated herein by reference in their entirety to form part of the present disclosure.

**1. Field of the Invention**

The present invention relates generally to radio transmission systems and, in particular, to a method and apparatus for wirelessly transmitting digital information that may be employed in wireless point-of-sale vending systems, such as pay-at-the-pump fuel dispensing systems.

**2. Background of the Disclosure**

Reflecting an ongoing effort to provide retailers and others with a competitive advantage, various types of cashless vending systems are known in the art. For example, some vending machines are equipped with card reading devices that enable the machines to accept payments using credit cards and/or debit cards. The ability to accept cashless payments provides a number of important advantages. Vendors are able to make sales to persons who may not possess cash or coinage in necessary amounts or denominations and can gain access to valuable data on buying behaviors. Consumers benefit by being required to carry less cash and by being provided with complete records of card transactions by the card issuer. Unlike cash, which can also be lost or stolen, credit card users benefit from various laws intended to protect cardholders from unauthorized purchases and other forms of fraud involving their accounts. Card purchases may also afford the consumer access to discounts,

rebates, or other special incentive programs which are commonly linked to card usage.

In order to realize such advantages, it is known to provide fuel dispensers at filling stations with magnetic card reading devices for the purpose of accepting purchases to be charged to a credit or debit card account. One manufacturer of fuel dispensers, Gilbarco, Inc. of Greensboro, N.C., offers a card reading device under the trademark "CRIND" that includes a card receptacle to accept the magnetic card and also happens to accept cash. In addition to the advantages just noted, providing card reading devices directly at the "gas pump" allows customers to make their purchases quickly without the need to walk to a cashier (possibly subjecting one to inclement weather), wait in line, or count change.

In an effort to provide an even greater degree of speed and convenience to customers, one major oil company has recently introduced another system to facilitate the vending of fuel at filling stations. This system, which typically augments rather than replaces the magnetic card reading devices already present at the pump, is presently being promoted under the trademark "SPEEDPASS". The "SPEEDPASS" system is based on radio frequency identification (RFID) technology marketed by Texas Instruments under the trademark "TIRIS." "TIRIS" technology has also reportedly been employed to track items in a variety of material handling systems and to automatically assess tolls to vehicles on toll roads without the necessity of stopping the vehicle.

Customers interested in using the "SPEEDPASS" fuel vending system enroll by filling out a form that requests information identifying a credit card account to which purchases made using the system are to be posted. This credit card information is electronically encoded into a high frequency (2.45 GHz) radio frequency (RF) transponder device that is small enough to be attached to a key ring or carried in some other manner by the consumer to whom the device is issued. The fuel dispensers at participating filling stations are provided internally with a receiving unit having an antenna mounted beneath a designated area on the external surface of the dispenser. The designated area is prominently marked with identifying indicia and printed instructions for using the "SPEEDPASS" system. The instructions direct the consumer to bring the transponder device into proximity of the designated area. When this is done, the receiving unit within the dispenser picks up the encoded account information transmitted by the transponder device. Once the information is appropriately decoded, it is used to authorize a purchase and, at an appropriate time (such as on completion of the dispensing operation), to post relevant information relating to the purchase (such as the amount of the purchase, the time of day the purchase was made and the like) to the corresponding account of the customer. The purchase is subsequently reflected on an invoice or billing statement provided by the credit card company or other entity.

While systems, such as the "SPEEDPASS" system, may offer an incremental improvement in speed and convenience over use of a credit card, they also suffer certain drawbacks. Notably, if the transponder is lost or stolen, it can be used without authorization at any participating station. The use of off-the-shelf transponder devices may also present a security risk. Such risk may be reduced by encoding the transponder with a secondary account number that identifies, but does not actually represent, an actual credit card or debit account number. While secondary account encoding affords additional security, such an approach limits or complicates universal acceptance of the system by vendors other than the

issuer of the transponder due to the need to make available to other vendors a database cross referencing the actual and secondary account numbers. It is a disadvantage to the consumer to be limited to use of the system with only a single vendor. It is likewise undesirable to require a consumer to carry multiple transponders in order to make purchases from a corresponding multiple number of vendors.

Systems utilizing a high frequency RF carrier are also of limited utility due to problems associated with the electric field shielding effects of vehicle bodies and/or metallic structures used in and around fuel pumps. Such shielding effects require that the transponder units be located other than within electrically shielded areas and limit the effective range and/or reliability of signal transmission and/or reception. Such shielding problems are not satisfactorily addressed by attempts to locate the transponder or other signaling device at some secure, but inconspicuous, location on the exterior of a vehicle. In such a location, the signaling device would be exposed to harsh conditions including temperature and humidity extremes, precipitation, icing and an increased risk of damage from physical impact. Locating the device inside the compartment which houses the fuel cap of the vehicle would subject the device to the electric field shielding problems already noted.

Therefore, a need exists for a method and apparatus for transmitting a digital information signal that permit transmission of digital information (e.g., a credit card account number) from substantially electrically shielded environments, such as fuel cap compartments of automobile trunks, thereby facilitating temporary or permanent attachment of such an apparatus within electrically shielded environments, and that provides the flexibility necessary to permit a transmitter employing such a method to be used in vending systems of multiple vendors. A vending system that employs such a method and apparatus would also be an improvement over the prior art.

#### SUMMARY OF THE INVENTION

In view of the foregoing problems and limitations of the prior art, it is one object of the present invention to provide a transmission system for digital information that permits such digital information to be transmitted from a substantially electrically shielded environment. In one aspect of the present invention, a constant frequency generator generates a constant frequency signal, a phase modulator varies the instantaneous phase of the constant frequency signal based on the digital information, and a resonant circuit including an antenna averages the phase modulated signal to simulate a frequency modulated (FM) signal that includes the digital information. In another aspect of the present invention, the simulated FM signal is transmitted from the antenna primarily via a magnetic field at a carrier frequency of about ten kilohertz or less, thereby enabling the transmission of the digital information from an electrically shielded environment, such as from inside the trunk of an automobile. In a further aspect of the present invention, the phase modulator varies the instantaneous phase of the constant frequency signal by transitioning the constant frequency signal through at least two phases during any one bit transmission period to facilitate detection of the digital information using very low cost small scale integrated (SSI) circuits.

It is another object of the present invention to provide a product vending system in which the aforesaid method and apparatus may be utilized. The product vending system

preferably includes a card reading device that, in response to obtaining billing information for a consumer to be charged for the product, provides the billing information to a creditor of the consumer; a receiver for receiving a radio signal from a transmitter associated with a receptacle for the product; a card reader interface, operably coupled to the receiver and the card reading device, that determines whether the radio signal includes billing information for the consumer to be charged and, in response to determining that the radio signal includes the billing information, converts the billing information received from the receiver into a format compatible with the card reading device and generates a control signal to enable the product dispenser to dispense the product; and a transmitter, operably coupled to the card reader interface, that transmits, responsive to at least one control signal from the card reader interface, at least one interrogation signal that includes a request for the billing information.

It is a further object of the present invention to incorporate a jamming circuit into the product vending system, wherein the jamming circuit is coupled to the card reader interface and transmits a jamming signal to prevent the receiver from receiving the radio signal until at least a portion of the product dispenser is in sufficient proximity to the receptacle to permit reception of the radio signal.

It is yet another object of the present invention to provide a product vending system that utilizes half-duplex radio signaling to dispense a product from a dispenser to a receptacle for the product. Such a product vending system includes a transaction controller that generates control signals to facilitate dispensing of the product from the dispenser; a first transmitter, operably coupled to the transaction controller and forming a part of the dispenser, that transmits an interrogation signal responsive to a control signal from the transaction controller, the interrogation signal including a request for billing information of a consumer to be charged for the product; a first receiver, locatable in a substantially electrically shielded environment that is physically associated with the receptacle, that receives the interrogation signal; a second transmitter, operably coupled to the first receiver, that transmits a radio signal responsive to receipt of the interrogation signal, the radio signal including the billing information; and a second receiver, operably coupled to the transaction controller, that receives the radio signal, demodulates the radio signal to recover the billing information, and provides the billing information to the transaction controller.

These and other objects and advantages of the invention will become apparent to the person of ordinary skill in the art upon review of the following detailed description of a preferred embodiment taken in conjunction with the appended drawings in which like reference numerals designate like items.

#### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a pictorial and block diagram depiction of a product vending system in accordance with a preferred embodiment of the present invention.

FIG. 2 is a block diagram depiction of the product vending system of FIG. 1.

FIG. 3 is a block diagram depiction of a preferred transceiver for the product vending system of FIG. 1.

FIG. 4 is a timing diagram of expanded time scale illustrating generation of a simulated FM signal by a transmitter portion of the transceiver of FIG. 3 and recovery of such simulated FM signal by a receiver portion of the transceiver of FIG. 3.

FIGS. 5A–5C together form a circuit schematic of a preferred embodiment of the transceiver of FIG. 3.

FIG. 6 is a block diagram depiction of a preferred transceiver for use with a product dispenser incorporated in the product vending system of FIG. 1.

FIG. 7 is a circuit schematic of a preferred embodiment of the transceiver of FIG. 6.

FIG. 8 is a block diagram of a jamming circuit in accordance with a preferred embodiment of the present invention.

FIG. 9 is a logic flow diagram illustrating steps executed by a card reader interface to generate a control signal to enable a vending machine to dispense a product in accordance with a preferred embodiment of the present invention.

FIG. 10 is a logic flow diagram illustrating steps executed by a transmitting device to transmit digital information, even from a substantially electrically shielded environment, in accordance with a preferred embodiment of the present invention.

FIG. 11 is a logic flow diagram illustrating steps executed by a receiving device to receive digital information transmitted, even from a substantially electrically shielded environment, in accordance with a preferred embodiment of the present invention.

FIG. 12 is a logic flow diagram illustrating steps executed by a product vending system to vend a product in accordance with the present invention.

FIG. 13 is a logic flow diagram illustrating steps executed to acquire a product from a vending device in accordance with the present invention.

FIG. 14 is a logic flow diagram illustrating steps executed in a product vending system to vend a product in accordance with the present invention.

FIG. 15 is a logic flow diagram illustrating steps executed by a product vending device to vend a product in accordance with a preferred embodiment of the present invention.

FIG. 16 is a logic flow diagram illustrating steps executed to acquire a product from a vending device in accordance with a preferred embodiment of the present invention.

#### DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

Generally, the present invention encompasses a method and apparatus for transmitting a digital information signal and a vending system incorporating such a method and apparatus. In a preferred embodiment, a signal generator (e.g., an oscillator) generates a constant frequency signal. A phase modulator varies the instantaneous phase of the constant frequency signal to represent digital information, thereby producing a phase modulated signal. A tuned resonant circuit filters and averages the phase modulated signal to produce a simulated FM signal, and transmits the simulated FM signal via its antenna. One business transaction system (e.g., a vending system) incorporates such a transmitter to facilitate transmission of billing information from a device locatable within a substantially electrically shielded environment. Another business transaction system (e.g., a vending system, a material tracking system, or a highway toll system) preferably incorporates such a transmitter to facilitate half duplex transmission of digital information regardless of whether or not the digital information is transmitted from a device located within a substantially electrically shielded environment. By transmitting digital information in this manner and utilizing such a transmitter in a vending system, the present invention permits mounting of

the transmitter in a location where the transmitter may be hidden from view and is relatively physically secure from loss or theft, such as within a substantially electrically shielded enclosure (e.g., within the trunk or under the hood of an automobile), while allowing a consumer possessing such a fixed transmitter to engage in cashless business transactions, such as purchasing fuel for his or her vehicle or paying roadway usage fees. Thus, the present invention facilitates cashless and wireless vending transactions without requiring a consumer to carry (and potentially lose or have stolen) any RFID transmitter(s) because the transmitter of the present invention may be secured near a receptacle for a product, such as near the fuel inlet of a vehicle, for any consumer-selectable length of time.

The present invention can be more fully understood with reference to FIGS. 1–16. FIG. 1 is a pictorial depiction of a product vending system 10 in accordance with a preferred embodiment of the present invention. The preferred product vending system 10 is a fuel vending system and includes a product vending device 11 that dispenses a product (e.g., fuel) and a receptacle 51 for the product. In the preferred embodiment, the product vending device 11 includes a fuel pumping station 12, at least one hose 13 through which fuel from the fuel pumping station 12 flows, a card reading device 35, a transaction processor 30, and a disablement device 44. The hose 13 includes a dispenser 18 containing a nozzle 20 for directing the fuel into the receptacle 51 and a transceiver 22 (combination of transmitter and receiver) fitted with an antenna (not shown). The transceiver 22 is preferably constructed on a flat, ring-shaped printed circuit (PC) board, which board is mounted on the dispenser 18 inside a sealed cap, such that the nozzle protrudes through the hole in the ring-shaped PC board. The transceiver 22 is hard-wired to the transaction controller 30 via the hose 13 to receive direct current power and signaling instructions from the transaction controller 30. The architecture and operation of the transceiver 22 are discussed in more detail below. The fuel pumping station 12, the hose 13 (less any connection to the transceiver 22), and the dispenser (less the transceiver 22) may suitably comprise one of the “ADVANTAGE™” series of fuel dispensers available from Gilbarco, Inc. of Greensboro, N.C.

The card reading device 35 is connected to the transaction controller 30 (also referred to herein as a card reader interface) and preferably comprises a point of sale terminal, such as those that are commercially available from Gilbarco, Inc. under the trademark “CRIND.” The card reading device 35 includes a card receptacle 32 for accepting credit cards, debit cards, and the like, and detecting the respective account information from the inserted card. The card reading device 35 may further include a display 31, a keypad 33, and a currency receptacle 34, although such elements do not form an integral part of the present invention.

The disablement device 44 may take the form of a limit switch or proximity detector that operates to selectively disable the transceiver 22 when the dispenser 18 is located in its nozzle boot 48. In the preferred embodiment, however, the disablement device 44 comprises a jamming circuit that operates under the control of the transaction controller 30 to transmit a jamming signal that prevents the transceiver 22 from receiving any other radio signals when the transceiver 22 is located in the physical vicinity of the disablement device 44. The disablement device 44 is preferably located near the portion of the product vending device 11 that retains the dispenser 18 until a consumer removes the dispenser 18 in anticipation of receiving the product. As shown, the disablement device 44 is preferably located near the nozzle

boot 48 in a fuel vending system. In an alternative embodiment, the disablement device 44 might comprise a logic circuit that generates a disable signal when the dispenser 18 is physically disposed within its nozzle boot 48 as sensed by a limit switch or a non-contact proximity detector. That is, instead of transmitting a jamming radio signal to prevent the transceiver 22 from receiving signals, the disablement circuit 44 might disable a portion (e.g., demodulator) of the transceiver 22 through application or removal of a voltage to or from a control section of the portion to be disabled.

The product receptacle 51 may be a stand-alone device, such as a gasoline can, or may form an integral part of a larger apparatus, such as the fuel inlet or fuel tank of a motorized vehicle 60, as shown in FIG. 1. In either case, a transceiver 50 is mounted, or otherwise attached, near (e.g., within one meter of) the receptacle 51 to facilitate radio communication with the transceiver 22 associated with the product dispenser 18 during the transaction. For example, when the receptacle 51 forms part of a motorized vehicle 60, the transceiver 50 may be mounted within a trunk 53 of the vehicle 60 directly above (i.e., adjacent to) the fuel inlet 50. In the alternative, the transceiver may be mounted on the fuel inlet access door 52 or at any other location in the proximity of the receptacle 50.

In the preferred embodiment, the consumer purchases or obtains the transceiver 50 from a vendor or a credit card or debit card issuer and mounts, or otherwise attaches, the transceiver 50 in a desired location (e.g., automobile trunk 53). The transceiver 50 is programmed to electronically store in memory the consumer's credit or debit card account information as well as any other desired billing-related information. Such programming may take place before, at, or after the time of issuance of the transceiver 50 to the consumer. The transceiver 50 is preferably battery-powered (e.g., using a lithium or other suitable battery exhibiting long shelf life and operating life) and packaged inside a sealed or molded plastic case or potting material or another suitable material. Consequently, in the preferred embodiment, the transceiver 50 is self-sufficient and does not require any electrical connections to the vehicle 60. Alternatively, the transceiver 50 may optionally be powered from the power supply associated with vehicle 60, either directly or through a charger coupled to a battery.

In order to program the transceiver 50 with account information, the account information is typically read from the magnetic stripe of a credit card using a conventional reading device. The data on the stripe typically contains a relatively high ratio of redundancy, which includes inefficient character encoding plus a parity bit for each digit (i.e., five bits of data per digit to represent the digits 0-9, which can be ideally represented using 3.32 bits/digit). This redundancy is preferably reduced or eliminated using any suitable data compression technique to compress the account number, the expiration date, and the extra data on track 2 of the magnetic stripe. The compression serves to reduce the number of bits required to be transmitted, and accordingly the transmission time, which prolongs battery life.

FIG. 2 is a block diagram depiction of the product vending system 10. As discussed above, the vending system 10 includes the transceivers 22, 50 and their associated antennas 209, 211, the dispenser 118, the hose 13, the card reader interface 30, the card reading device 35, the card receptacle 32, and the jamming circuit 44. Referring to FIGS. 1 and 2, operation of the product vending system 10 occurs substantially as follows in accordance with the present invention.

When a consumer desires to obtain a product, such as fuel, the consumer opens the fuel inlet access door 52, removes the fuel inlet cap (not shown), and removes the dispenser 18 from its retainer 48. In anticipation of a future fuel dispensing transaction, the card reader interface/transaction controller 30 periodically instructs the dispenser transceiver 22, preferably via a bi-directional data line connected to the hose 13, to determine whether a receptacle transceiver 50 is in sufficient proximity to the dispenser 18 to begin such a transaction. Depending on the type of fuel vending device 11, multiple dispensers might be employed (e.g., one dispenser for each grade of gasoline). Accordingly, the card reader interface 30 periodically instructs each connected dispenser transceiver 22 to determine whether a receptacle 50 is present. In the preferred embodiment, each dispenser transceiver 22 is instructed or polled once every N times 170 milliseconds to determine the presence of a receptacle transceiver 50, where N is the number of dispensers 18 that happen to be supported by the card reader interface 30.

When instructed to determine the presence of a receptacle transceiver 50, the dispenser transceiver 22 first transmits an interrogation signal requesting billing information for a consumer to be charged for the product. After transmitting the interrogation signal, the dispenser transceiver 22 receives signals for a predetermined time duration (e.g., a time duration associated with receiving eight bits) in an attempt to receive an acknowledgment of the interrogation signal. Once the receive cycle of a poll has completed, the received information (e.g., bits), if any, is correlated with the pre-established acknowledgment sequence in accordance with known techniques to determine whether a receptacle transceiver 50 is present. In the preferred embodiment, the received bits are also correlated with a jamming signal transmitted by the jamming circuit 44 during the polling cycle of the particular dispenser transceiver 22. The jamming signal comprises a frequency shift keying (FSK) encoded signal (jamming code 205) having a bit sequence that does not resemble a valid receptacle transceiver 50 response. The jamming code 205 is generated by the card reader interface 30 and is provided to the jamming circuit 44 for transmission. When bits received by the dispenser transceiver 22 correlate to the jamming code 205, the card reader interface 30 presumes that the dispenser 18 is still in its retainer 48 and no receptacle transceiver 50 is present. Thus, until an interrogation signal acknowledgment from the receptacle transceiver 50 is of a sufficient signal strength to dominate the jamming signal, the dispenser transceiver 22 will continue receiving the jamming signal and no dispensing will take place. Once the card reader interface 30 determines that a receptacle transceiver 50 is present, the card reader interface 30 preferably terminates the jamming code 207 temporarily until the transaction is completed.

Analogous to the preferred intermittent transmission of interrogation signals by the dispenser transceiver 22, the receptacle transceiver 50 preferably enables its receiver portion intermittently to receive interrogation signals. In the preferred embodiment, the receiver portion of the transceiver 50 is enabled intermittently at a duty cycle of approximately eighteen percent (18%) to save battery current.

When enabled, the receiver portion of the receptacle transceiver 50 receives signals and correlates the received signals with a predetermined interrogation signal sequence to determine whether an interrogation signal has been received. In the preferred embodiment, the receiver correlation circuit is designed such that the first three bits at the initiation of receive enable are used to seed a three bit maximal length sequence (MLS) generator. The MLS gen-

erator then generates the next bit in the sequence, which for proper correlation exactly matches the received bit. The MLS generation process continues until either the end of an interrogation sequence, as indicated by appropriate stop bits, or an inequality occurs. Once an inequality occurs or an end of interrogation is detected, the receiver portion of the receptacle transceiver 50 is disabled, sending the receptacle transceiver 50 to a low current drain state to conserve battery power and extend battery life.

In a purely random environment, where the probability of encountering a binary "zero" and a binary "one" are equally weighted, the average receiver enable duty cycle is given by the following equation:

$$\text{Duty cycle} = 0.5 * 4/22 + 0.25 * 5/22 + 0.125 * 6/22 + \dots$$

which yields an effective receiver duty cycle of 22.5 percent. Assuming that the disabled receiver draws negligible current, the operational life of the battery used to power the receptacle transceiver 50 can be extended by four times its continuous duty operational life. In the preferred embodiment, the periodic transmissions of interrogation signals by the dispenser transceiver 22 and the periodic enabling of the receiver portion of the receptacle transceiver 50 are appropriately phased, such that a receptacle transceiver 50 in a coverage area of the dispenser transceiver 22 will be detected by the dispenser transceiver 22 within one complete card reader interface polling cycle.

Thus, prior to and during the consumer's removal of the dispenser 18 from its retainer 48, the above-described intermittent interrogation signal transmissions occur without the consumer's knowledge. Once the dispenser transceiver 22 is positioned sufficiently close to the receptacle transceiver 50 to permit reception of the interrogation signal and the receptacle transceiver 50 acknowledges reception of the interrogation signal during a polling cycle of the dispenser transceiver 22, the receptacle transceiver 50 transmits billing information (e.g., a credit card or debit card account number, expiration date, creditor identification, or any other information stored by the issuer of the charge or debit account) to the dispenser transceiver 22 in the form of a radio signal 55. For security purposes, the billing information is preferably encrypted prior to transmission using any suitable encryption scheme, such as a common key scheme, of which many types offering excellent levels of security are well known to those skilled in the art. In addition, in the preferred embodiment, the receptacle transceiver 50 transmits the interrogation signal acknowledgment and the billing information via a magnetic field at a frequency of 8.192 kilohertz (kHz), in the manner described in U.S. patent application Ser. No. 08/956,732, which is hereby expressly incorporated herein by reference in its entirety to form part of the present disclosure. By using low frequency magnetic coupling to convey information instead of high frequency electromagnetic coupling, the receptacle transceiver 50 can be located within substantially electrically shielded environments physically associated with the receptacle 51 for the product, such as automobile trunks or automobile hoods, without substantially affecting transmission or reception.

Upon receiving the radio signal 55, the dispenser transceiver 22 demodulates, decodes, and decrypts the radio signal 55 to extract the digital information, if any, contained therein and provides the digital information to the card reader interface 30. The card reader interface 30 determines whether the digital information represents valid billing information for a consumer to be charged for the product. To make this determination, the card reader interface 30 performs some initial processing itself, such as executing one or

more known algorithms to test for a valid credit or debit card and examining the digits corresponding to the expiration date of the card to determine whether the expiration date associated with the billing information has passed. Upon completing this initial processing, the card reader interface 30 forwards the billing information to the appropriate creditor for authorization of the transaction. To accomplish such forwarding of the billing information, the card reader interface 30 emulates a credit or debit card swipe in the card receptacle 32 by converting the billing information into a format compatible with the card reading device 35 and providing the converted billing information 203 to the card reading device 35 on the same data bus as corresponding information is typically provided after a credit or debit card is swiped in the card receptacle 32. That is, the card reader interface 30 temporarily seizes the connection 207 between the card receptacle 32, exposed externally at the fuel vending device 11, and the internal electronics of the card reading device 35. The card reader interface 30 emulates the sequence of clock and data bits 201 ordinarily produced by a manual swipe of a credit or debit card. The internal interface electronic module of the card reading device 35, unaware that the transaction was initiated by the card reader interface 30, forwards the account information to a remotely-located Point of Sale (POS) computer (not shown), which responds with authorization approval or denial. Therefore, the present invention can be readily installed in existing fuel vending devices by simply installing the card reader interface 30 and the jamming circuit 44, and by connecting the card reader interface 30 in series with the data bus ordinarily connecting the card receptacle 32 to the card reading device 35.

Once the POS computer responds via the card reading device 35 authorizing the transaction, the card reader interface 30 releases the card receptacle control lines, allowing normal operation of the card receptacle and thereby effectively generating a control signal to enable the dispenser 18 to dispense the product. Upon completion of the dispensing operation, the POS computer debits the account identified in the billing information for the amount of the product purchase in accordance with known techniques.

As described above, the preferred embodiment of the present invention provides a vending system in which half-duplex transceivers associated with a product dispenser and a receptacle for the product are employed to facilitate point-of-sale billing without requiring any action by the consumer other than the consumer's normal positioning of the dispenser in or near the receptacle. By contrast, prior art fuel vending devices, such as those incorporating "SPEED-PASS" technology, require the consumer to carry a transponder containing the billing information and to position the transponder near a receiver on the fuel pumping station prior to removing the dispenser from its retainer and positioning the dispenser in or near the receptacle. Thus, the present invention eliminates the need to carry yet another device containing account information which can be lost or stolen at any time. In addition, the present invention utilizes efficient half-duplex transceivers to efficiently transmit billing information from the receptacle transceiver only when requested for it by the dispenser transceiver, thereby eliminating the need for the battery-operated receptacle transceiver to continuously transmit information and consume battery power. Still further, since only a common encryption key need be made available to other vendors, when encryption is used, the present invention can readily be implemented on a universally acceptable basis so that consumers are not limited to use of the system only for purchases from

a particular vendor, in sharp contrast to prior art systems, such as the "SPEEDPASS" system.

Although described above with reference to half-duplex operation of the transceivers 22, 50, the present invention is also applicable in a simplex communication environment. In such a system, a transmitter is mounted in the location of the receptacle transceiver 50 and a receiver is mounted in the location of the dispenser transceiver 22. The transmitter continually or periodically transmits the billing information in the form of a radio signal. The receiver continually or periodically receives signals and forwards the digital information contained in such signals to the card reader interface 30. However, for the reasons discussed above, simplex operation may be less favorable than half-duplex operation.

In addition to its application to the dispensing of fuel or any other product, the radio signal transmission method and apparatus of the present invention also has application to the tracking of inventory or to the transaction of other business, such as payment of road usage fees, in a wireless manner. In such non-product dispensing applications, the transmission technique employed in the preferred embodiment of the receptacle transceiver 50 and described in more detail below with respect to FIGS. 3-5 and 10 may be utilized to permit wireless transmission of billing information or inventory tracking numbers from battery-powered transceivers located in substantially electrically shielded enclosures, such as under automobile hoods, inside automobile trunks, or on medical, office or industrial equipment, where tracking assets is crucial, but where existing RF systems are unreliable due to electric field shielding effects.

FIG. 3 is a block diagram depiction of the preferred transceiver 50 for use near the fuel receptacle 51 in the product vending system 10 of FIG. 1. The transceiver 50 preferably operates in a half-duplex mode and includes a memory device 301 for storing digital information, such as billing information, a processor/data generator 303, a phase modulator 305, a tuned circuit 307, an antenna 309, a constant frequency generator 311, an amplifier 315, an FM demodulator 317, a lowpass filter 319, and a comparator 321. The memory device 301 preferably comprises read/write random access memory (RAM) that forms part of the processor/data generator 303. The preferred implementation of the remaining elements of the transceiver 50 are described in detail below with respect to the schematic depiction of such elements provided in FIG. 5.

Referring now to FIGS. 3 and 4, operation of the preferred receptacle transceiver 50 occurs substantially as follows in accordance with the present invention. During a dispenser transceiver polling cycle, the antenna 309 receives an interrogation signal via a radio channel 55 and passes the signal to the tuned circuit 307 for filtering and averaging. In the preferred embodiment, the interrogation signal is modulated in the dispenser transceiver 22 using FSK modulation. FSK modulation is preferably used in the dispenser transceiver 22 due to its ease of implementation in a high clock frequency integrated circuit (IC) and because the dispenser transceiver can be powered from a source other than a battery, such as a direct current source generated within the product vending device. Thus, the power requirements of the IC used to generate the FSK modulated signal are of less of a concern in the dispenser transceiver than are such power requirements in the battery-powered receptacle transceiver 50. By contrast, the preferred receptacle transceiver 50 utilizes low power, low clock frequency ICs, flip-flops, and NAND gates to create a simulated frequency modulated (FM) signal, as described below.

During receive mode, the phase modulator 305 and any other transmit amplifiers, if used, present a high impedance

(e.g., greater than ten times the input impedance of the receiver amplifier 315) to the received signal. Consequently, the tuned circuit 307 passes the averaged signal 329 to the receive path of the transceiver 50. The averaged signal 329 is amplified and leveled by the amplifier 315 to produce a constant envelope signal 330 and the constant envelope signal is provided to the FM demodulator 317. As is well known, an FM demodulator may be employed to demodulate an FSK-modulated signal because FSK modulation does not impart any information in the amplitude of the transmitted signal and the data may be recovered without resolving the actual phase of the recovered signal.

Upon receiving the constant envelope signal 330, the FM demodulator 317 recovers an analog representation of the transmitted bits by mixing the constant envelope signal 330 with a time-delayed version of itself in accordance with known delay discrimination techniques. In the preferred embodiment, the frequency of the received signal 329 is approximately 8.192 kHz and equals the frequency of the signal generated by the constant frequency generator 311. A frequency of about 10 kHz or less is selected to permit practical implementation of an antenna 309 that conveys and receives signals primarily via a magnetic field and, therefore, facilitates transmission of signals from within substantially electrically shielded enclosures. Such an antenna 309 is described in detail in commonly-assigned U.S. patent application Ser. No. 08/956,732, which is expressly incorporated herein by reference in its entirety to form part of the present disclosure.

The FM demodulator 317 provides the analog representation to the lowpass filter 319 for filtering and frequency spreading. The filtered representation is provided to the comparator 321, which compares the filtered representation with a preset analog signal to detect the transmitted bits and ultimately recover the transmitted data 323 (e.g., request for billing information). The request for billing information is then provided to the processor 303.

Upon recovering a bit sequence that corresponds to a request for billing information, the receptacle transceiver 50 begins the sequence of steps associated with transmitting the billing information. The processor/data generator 303 retrieves the data 323 corresponding to the billing information from the memory device 301 and instructs the phase modulator 305 to vary a phase of the constant frequency signal generated by the constant frequency generator 311 to produce a phase modulated signal 325 that represents the data. The microcontroller source code associated with operation of the processor 303, less any code related to encryption or decryption, is contained in the attached microfiche appendix.

In the preferred embodiment, the phase modulator 305 has four selectable phases (0 degrees, 90 degrees, 180 degrees, and 270 degrees) and transitions through two phases selected by the processor 303 during each bit transmission period to represent a particular bit of the data 323. It is well known that frequency modulation is mathematically equivalent to continuously modifying the instantaneous phase of a carrier frequency (fc), yielding the mathematical result for the instantaneous frequency:

$$f(t)=fc+1/(2\pi)*d\Phi/dt$$

where  $\Phi$  is the instantaneous phase of the carrier frequency and  $t$  is time.

Thus, if, for example, one wished to represent a binary "one," which in the FM case might be represented by an instantaneous frequency greater than the carrier frequency,

an equivalent waveform can be generated by continuously and smoothly adding a positive offset to the phase of the carrier frequency. Similarly, a binary "zero" could be represented by continuously and smoothly subtracting a negative offset to the phase of the carrier frequency. Therefore, in this case, if one considers a phasor diagram with 0 degrees on the positive X-axis, 90 degrees on the positive Y-axis, 180 degrees on the negative X-axis, and 270 degrees on the negative Y-axis, a binary "one" might be denoted by a counterclockwise rotation of the phasor; whereas, a binary "zero" might be denoted by a clockwise rotation of the phasor, wherein the carrier frequency is denoted by no rotation. In an analogous manner, a binary "one" could be represented by an instantaneous frequency less than the carrier frequency and a binary "zero" could be represented by an instantaneous frequency greater than the carrier frequency. Consequently, in this case, a binary "one" might be denoted by a clockwise rotation of the phasor; whereas, a binary "zero" might be denoted by a counterclockwise rotation of the phasor. Therefore, instantaneous phase transitions applied by the phase modulator 305 result in a phase modulated signal 325 with instantaneous frequency changes that correspond to the bits of data 323. The number of phase transitions utilized to represent a particular bit is related to the average frequency deviation of the modulated signal.

As noted above, the processor 303 preferably instructs the phase modulator 305 to introduce two phase transitions per bit transmission period. However, because phase selection is instantaneous, each bit is represented by two abrupt 90-degree phase transitions, either clockwise or counterclockwise, instead of a smooth rotation of the phase of the constant frequency signal produced by the constant frequency generator 311. To account for such abrupt phase transitions, the phase modulated signal 325 is filtered and averaged by the tuned circuit 307 to produce a simulated FM signal 327. That is, the output of the tuned circuit 307 is not a true FM signal, but rather approximates an FM signal waveform. In the preferred embodiment, additional filtering and averaging occurs in the dispenser transceiver 22 as described below to produce a signal that more closely approximates an FM signal prior to demodulation. However, in an alternative embodiment, all such filtering and averaging may be included in the transmit portion of the receptacle transceiver 50.

Further understanding of the aforesaid phase modulation approach can be gained by referring to FIG. 4, which is a timing diagram of expanded time scale illustrating generation and recovery of the simulated FM signal. Starting at the top of FIG. 4, the first timing diagram depicts exemplary data 323 retrieved from the memory device 303. In this example, the data consists of the bit sequence "00101101". Each bit has a respective bit transmission time of  $\Delta t$ .

The second diagram depicts the preferred phase transitions of the constant or carrier frequency signal introduced by the phase modulator 305 to represent the data 323 in response to instruction from the processor 303. Thus, the second diagram illustrates the phase of the phase modulated signal 325 during each bit transmission period. As shown by the diagram, a binary "zero" is represented by two clockwise phase transitions (e.g., from 0 degrees to 270 degrees and then from 270 degrees to 180 degrees); whereas a binary "one" is represented by two counterclockwise phase transitions (e.g., from 180 degrees to 270 degrees and then from 270 degrees to 0 degrees).

The instantaneous frequency of the phase modulated signal 325 at each phase transition is depicted in the third diagram. The instantaneous frequency can be shown math-

ematically to be an impulse of either positive or negative polarity corresponding to a positive or negative phase transition. However, such a waveform of impulses has little value as an FM waveform because the FM component is too narrow to measure accurately. Thus, the FM impulses must be broadened or spread in time to be effective.

Broadening of the instantaneous frequency waveform is depicted in the fourth diagram through illustration of the instantaneous frequency of the tuned circuit output signal 327. The bandpass response of the tuned circuit 307 spreads the FM impulses in time, thereby producing a simulated FM signal that is detectable. Additional filtering further spreads the FM impulses in time as depicted in the fifth diagram. As noted above and discussed in more detail below, the additional filtering is preferably provided in the dispenser transceiver 22, although such filtering could alternatively be added to the transmit portion of the receptacle transceiver 50. The two remaining diagrams depict the recovered FM and data, and will be discussed in more detail below with respect to FIG. 6.

FIGS. 5A-5C together form a circuit schematic of a preferred embodiment of the receptacle transceiver 50 of FIG. 3. The preferred transceiver comprises a plurality of resistors 501-525, a plurality of capacitors 530-544, a plurality of transistors 551-556, a transformer 558, a diode 559, a plurality of NAND gates 561-564, a piezoelectric crystal 566, a plurality of flip-flops 571-576, a microcontroller 582, and two microcircuits 581, 583. The microcontroller 582 functions as the processor 303 and the memory device 301. The phase modulator 305 comprises microcircuit 581, which is a data selector that selects a single clock phase for transmission, according to a prescribed format, in an algorithm contained within the microcontroller 582.

The constant frequency generator 311 comprises an oscillator and the circuit including flip-flops 571-573. The oscillator is formed using a conventional tuning fork style piezoelectric crystal 566, two resistors 516, 517, proper loading capacitors 539, 540, and a conventional oscillator gate 561 as is well known in microelectronic designs. The oscillator provides a uniform clock waveform at 32,768 kHz having exceptional accuracy due to the crystal 566. The clock and integer subharmonic frequencies are utilized to provide the timebase for receptacle transceiver timing, synchronous clocking of processor state machines, and stimulus for a timer circuit internal to the microcontroller 582. The flip-flops 571-573 synthesize four clock phases of 8.192 kHz, which are applied for selection by the phase modulator 305.

The tuned circuit 307 comprises a resonant circuit and a driver circuit. The resonant circuit is formed from resistor 515, capacitors 537 and 538, transformer 558, and diode 559. The resonant circuit includes the antenna 309, which is formed by the transformer 558. The driver circuit comprises gates 562-564, metal oxide semiconductor (MOS) field effect transistor 554, resistor 518, and capacitor 541. Details of the operation of the tuned circuit 307 can be found in U.S. patent application Ser. No. 08/956,732, which is incorporated herein by reference.

The receiver amplifier 315 is formed from the combination of resistors 501-514, capacitors 530-536, and transistors 551-553. The FM demodulator 317 receives its input from the receiver amplifier 315 (see RCVRF port) and is formed using very inexpensive small scale integrated (SSI) microcircuits. The devices are low power, low cost complementary MOS devices, which enable the invention to be implemented conveniently and at low cost. Thus, as shown, the FM demodulator 317 includes flip-flops 574-576 and microcircuit 583.

The receiver lowpass filter 319 constitutes an active filter comprising resistors 519–521, capacitors 542–544, and transistor 555. Finally, the comparator 321 includes resistors 522–525 and transistor 556. Table 1 below is a parts listing for the transceiver 50 of FIGS. 5A–5C. In the preferred embodiment, all elements of the transceiver 50, with the exception of the crystal 566 and all the elements forming the receiver amplifier 315, the tuned circuit 307, and the antenna 309, are implemented within an application specific integrated circuit (ASIC).

TABLE 1

Reference Numeral(s)	Description	Quantity	Manufacturer	Manufacturer's Part Number
516	10 MΩ resistor	1	Panasonic Industrial Co. (Div. Of Matsushita Electric Corp. of America) (Secaucus, NY).	ERJ-6GEYJ-106
517	470 kΩ resistor	1	Panasonic Industrial Co. (Div. Of Matsushita Electric Corp. of America) (Secaucus, NY).	ERJ-6GEYJ-474
509, 511, 513, 522	1 MΩ resistor	4	Panasonic Industrial Co. (Div. Of Matsushita Electric Corp. of America) (Secaucus, NY).	ERJ-6GFYJ-105
518	220 kΩ resistor	1	Panasonic Industrial Co. (Div. Of Matsushita Electric Corp. of America) (Secaucus, NY).	ERJ-6GEYJ-224
515	22 kΩ resistor	1	Panasonic Industrial Co. (Div. Of Matsushita Electric Corp. of America) (Secaucus, NY).	ERJ-6GEYJ-223
514	10 kΩ resistor	1	Panasonic Industrial Co. (Div. Of Matsushita Electric Corp. of America) (Secaucus, NY).	ERJ-6GEYJ-103
502, 504, 506	2 MΩ resistor	3	Panasonic Industrial Co. (Div. Of Matsushita Electric Corp. of America) (Secaucus, NY).	ERJ-6GEYJ-205
507	1 kΩ resistor	1	Panasonic Industrial Co. (Div. Of Matsushita Electric Corp. of America) (Secaucus, NY).	ERJ-6GEYJ-102
512	82 kΩ resistor	1	Panasonic Industrial Co. (Div. Of Matsushita Electric Corp. of America) (Secaucus, NY).	ERJ-6GEYJ-823
505	200 kΩ resistor	1	Panasonic Industrial Co. (Div. Of Matsushita Electric Corp. of America) (Secaucus, NY).	ERJ-6GEYJ-204
508, 510	150 kΩ resistor	2	Panasonic Industrial Co. (Div. Of Matsushita Electric Corp. of America) (Secaucus, NY).	ERJ-6GEYJ-154
501, 503	430 kΩ resistor	2	Panasonic Industrial Co. (Div. Of Matsushita Electric Corp. of America) (Secaucus, NY).	ERJ-6GEYJ-434
519–521	330 kΩ resistor	3	Panasonic Industrial Co. (Div. Of Matsushita Electric	ERJ-6GFYJ-334

TABLE 1-continued

Reference Numeral(s)	Description	Quantity	Manufacturer	Manufacturer's Part Number
5			Corp. of America) (Secaucus, NY).	
524	510 kΩ resistor	1	Panasonic Industrial Co. (Div. Of Matsushita Electric Corp. of America) (Secaucus, NY).	ERJ-6GEYJ-514
10				
525	750 kΩ resistor	1	Panasonic Industrial Co. (Div. Of Matsushita Electric Corp. of America) (Secaucus, NY).	ERJ-6GEYJ-754
15				
523	22 kΩ resistor	1	Panasonic Industrial Co. (Div. Of Matsushita Electric Corp. of America) (Secaucus, NY).	ERJ-6GEYJ-223
20				
539	5 pF capacitor	1	Surface Mountable Electronic Components, Inc. (Austin, TX)	MCCE5R1D-2NO
540	20 pF capacitor	1	Surface Mountable Electronic Components, Inc. (Austin, TX)	MCCE200J-2NO
25				
541	68 pF capacitor	1	Surface Mountable Electronic Components, Inc. (Austin, TX)	MCCE680J-2NO
30				
531, 533, 535	0.1 μF capacitor	3	Surface Mountable Electronic Components, Inc. (Austin, TX)	MCCE104M-2NU
35				
538	0.01 μF capacitor	1	NIC Components Corp. (Amityville, NY)	NSPC103J50-TRB2
35				
537	3300 pF capacitor	1	Surface Mountable Electronic Components, Inc. (Austin, TX)	MCCE332J-3NO
35				
532, 534, 536	1000 pF capacitor	3	Surface Mountable Electronic Components, Inc. (Austin, TX)	MCCE102-K2NR
40				
530	10 μF capacitor	1	Panasonic Industrial Co. (Div. Of Matsushita Electric Corp. of America) (Secaucus, NY).	ECS-TOJY-106R
45				
542	6800 pF capacitor	1	Surface Mountable Electronic Components, Inc. (Austin, TX)	MCCE682-K2NR
50				
543	0.01 μF capacitor	1	Surface Mountable Electronic Components, Inc. (Austin, TX)	MCCE103-K2NR
50				
544	1800 pF capacitor	1	Surface Mountable Electronic Components, Inc. (Austin, TX)	MCCE182-K2NR
55				
559	Switching diode	1	Zetex, Inc. (Commack, NY)	FMMD914
551–553, 555–556	NPN transistor	5	ROHM Co., Ltd. (Antioch, TN)	MMST5089
554	N-Channel MOSFET	1	Digi-key (Fairchild)	NDS351-NCT-ND
60				
558	Transistor/antenna	1	Pole Zero Corp. (West Chester, Ohio)	See U.S. patent application Ser. No. 08/956,732
566	Watch crystal	1	Raltron (Miami, FL)	R38-32,768-KHz
561–564	Quad 2-In	1	National Semiconductor Corp. (Santa Clara, CA)	CD4011BCM
65	NAND			

TABLE 1-continued

Reference Numeral(s)	Description	Quantity	Manufacturer	Manufacturer's Part Number
571-576	Dual D Flip Flop	3	National Semiconductor Corp. (Santa Clara, CA)	CD4013BCM
583	18-Bit State Shift Register	1	SGS Thomson	4006BM
582	Processor	1	Microchip Technology, Inc. (Chandler, AZ)	PIC16LC71-04I/SO
581	Mux/ Demux	1	National Semiconductor Corp. (Santa Clara, CA)	CD4052BCM

FIG. 6 is a block diagram depiction of a preferred transceiver 22 for use with a product dispenser 18 incorporated in the product vending system 10 of FIG. 1. The dispenser transceiver 22 includes an FSK modulator 601, an oscillator 603, a tuned circuit 607, an antenna 609, a receiver amplifier 613, an FM demodulator 615, a lowpass filter 617, and a comparator 619. In the preferred embodiment, most of the transceiver circuitry resides in a microprocessor as described below with respect to FIG. 7.

Upon instruction from the transaction controller 30 via a data bus coupled to the dispensing hose 13 (e.g., during a dispenser transceiver polling cycle), the FSK modulator 601 modulates a carrier frequency generated by the oscillator 603 to represent the data (e.g., an interrogation signal) provided by the transaction controller 30. The FSK-modulated signal is then applied to the tuned circuit 607 and antenna 609 for transmission as a radio signal 55. The tuned circuit 607 and antenna 609 preferably comprise elements substantially similar to the tuned circuit 307 and antenna 309 of the receptacle transceiver 50, except that the antenna 309 of the dispenser transceiver 22 is preferably divided into two antenna elements, as shown in FIG. 7 and discussed in more detail below.

If a receptacle transceiver (e.g., receptacle transceiver 50) receives the interrogation signal and responds thereto, the dispenser receiver 22 receives billing information from the receptacle transceiver in the form of a radio signal 55. The antenna 609 receives the billing information signal and provides it to the tuned circuit 607. As discussed above, the billing information signal preferably constitutes a simulated FM signal. The tuned circuit 607 filters and averages the received signal to produce a signal 621 that further emulates an FM signal. Referring back to FIG. 4, the instantaneous frequency of signal 621 is depicted in the fifth diagram from the top. Thus, the receiving antenna 609 and the tuned circuit 607 further spread the transmitted signal to simulate an FM waveform. The simulated FM signal is amplified and leveled by the receiver amplifier 613 to produce a constant envelope signal at a frequency of the oscillator 603 that is applied to the FM demodulator 615. The FM demodulator converts the FM signal 621 to baseband and provides the baseband signal to the lowpass filter 617 (e.g., a 3-pole Butterworth filter). The lowpass filter 617 reconstructs the FM waveform 623, such that a simple magnitude comparator 619 may be used to reconstruct the original data waveform 625. The reconstructed FM waveform 623 and the recovered data 625 are depicted in FIG. 4 as the bottom two diagrams, respectively. It should be noted that time delays associated with filtering, transmission, and other processing are excluded from the timing diagrams of FIG. 4 for the purpose of clarity.

FIG. 7 is a circuit schematic of a preferred embodiment of the dispenser transceiver 22 of FIG. 6. The preferred transceiver 22 comprises a plurality of resistors 701-730, a plurality of capacitors 741-759, a plurality of transistors 781-784, two inductors 771, 772, two operational amplifiers 791, 792, a piezoelectric crystal 797, and a microcontroller 795. The microcontroller 795 functions as the FSK modulator 601, the FM demodulator 615, the lowpass filter 617, and the comparator 619. The source code for the microcontroller 795, less any code related to encryption or decryption, is provided in the attached microfiche appendix.

The oscillator 603 is formed using a conventional 10 MHz piezoelectric crystal 797, one resistor 730, proper loading capacitors 758, 759, and a conventional oscillator gate (contained in the microcontroller 795) as is well known in microelectronic designs. The oscillator 603 provides a uniform clock waveform at a carrier frequency of 10 MHz having exceptional accuracy due to the crystal 797. The carrier and integer subharmonic frequencies are utilized to provide the timebase for dispenser transceiver timing and synchronous clocking of microcontroller state machines.

The tuned circuit 607 comprises a resonant circuit and a driver circuit. The resonant circuit is formed from resistor 701, capacitors 741-743, and inductors 771, 772. The resonant circuit includes the antenna 609, which is formed by the two inductors 771, 772. The driver circuit comprises MOSFET transistor 784, resistors 728 and 729, capacitor 757, and NAND gates that are resident in the microcontroller 795. Operation of the tuned circuit 607 is provided in detail in commonly-assigned U.S. patent application Ser. No. 08/956,732, which is incorporated herein by reference. The receiver amplifier 613 is formed from the combination of resistors 702-727, capacitors 744-756, transistors 781-783, and operational amplifiers 791 and 792.

Table 2 below is a parts listing for the preferred transceiver 22 of FIGS. 7A-7B. In the preferred embodiment, all elements of the transceiver 22, with the exception of the crystal 797 and all the elements forming the receiver amplifier 613, the tuned circuit 607, and the antenna 609, are implemented within an ASIC.

TABLE 2

Reference Numeral(s)	Description	Quantity	Manufacturer	Manufacturer's Part Number
701	33 kΩ resistor	1	Panasonic Industrial Co. (Div. Of Matsushita Electric Corp. of America) (Secaucus, NY).	ERJ-3GSYJ-333
703, 708, 724	560 kΩ resistor	3	Panasonic Industrial Co. (Div. Of Matsushita Electric Corp. of America) (Secaucus, NY).	ERJ-3GSYJ-564
726	300 kΩ resistor	1	Panasonic Industrial Co. (Div. Of Matsushita Electric Corp. of America) (Secaucus, NY).	ERJ-3GSYJ-303
709, 711	330 kΩ resistor	2	Panasonic Industrial Co. (Div. Of Matsushita Electric Corp. of America) (Secaucus, NY).	ERJ-365YJ-334
705	200 kΩ resistor	1	Panasonic Industrial Co. (Div.	ERJ-3GSYJ-204

TABLE 2-continued

Reference Numeral(s)	Description	Quantity	Manufacturer	Manufacturer's Part Number
710	82 kΩ resistor	1	Of Matsushita Electric Corp. of America) (Secaucus, NY). Panasonic Industrial Co. (Div. 823	ERJ-3GSYJ-823
702	18 kΩ resistor	1	Of Matsushita Electric Corp. of America) (Secaucus, NY). Panasonic Industrial Co. (Div. 183	ERJ-3GSYJ-183
718, 728	100 Ω resistor	2	Of Matsushita Electric Corp. of America) (Secaucus, NY). Panasonic Industrial Co. (Div. 101	ERJ-3GSYJ-101
713, 717	360 kΩ resistor	2	Of Matsushita Electric Corp. of America) (Secaucus, NY). Panasonic Industrial Co. (Div. 364	ERJ-3GSYJ-364
714	820 Ω resistor	1	Of Matsushita Electric Corp. of America) (Secaucus, NY). Panasonic Industrial Co. (Div. 821	ERJ-3GSYJ-821
715	200 Ω potentiometer	1	Digi-Key P1S201CT	744, 746, 749, 754
707	6.8 kΩ resistor	1	Panasonic Industrial Co. (Div. Of Matsushita Electric Corp. of America) (Secaucus, NY). ERJ-3GSYJ-682	741
727	2.2 kΩ resistor	1	Panasonic Industrial Co. (Div. Of Matsushita Electric Corp. of America) (Secaucus, NY). ERJ-3GSYJ-222	747, 748, 750, 755, 756
716	680 kΩ resistor	1	Panasonic Industrial Co. (Div. Of Matsushita Electric Corp. of America) (Secaucus, NY). ERJ-3GSYJ-684	745, 760, 753
719, 721, 729	100 kΩ resistor	3	Panasonic Industrial Co. (Div. Of Matsushita Electric Corp. of America) (Secaucus, NY). ERJ-3GSYJ-104	50 751, 752
720	39 kΩ resistor	1	Panasonic Industrial Co. (Div. Of Matsushita Electric Corp. of America) (Secaucus, NY). ERJ-3GSYJ-393	55 758
712	8.2 kΩ resistor	1	Panasonic Industrial Co. (Div. Of Matsushita Electric Corp. of America) (Secaucus, NY). ERJ-3GSYJ-822	759, 743
706	1.2 kΩ resistor	1	Panasonic Industrial Co. (Div. Of Matsushita	65 771

TABLE 2-continued

Reference Numeral(s)	Description	Quantity	Manufacturer	Manufacturer's Part Number
5	20 kΩ resistor	1	Electric Corp. of America) (Secaucus, NY). Panasonic Industrial Co. (Div. Of Matsushita Electric Corp. of America) (Secaucus, NY). ERJ-3GSYJ-203	ERJ-3GSYJ-203
723	5.1 kΩ resistor	1	Panasonic Industrial Co. (Div. Of Matsushita Electric Corp. of America) (Secaucus, NY). ERJ-3GSYJ-512	ERJ-3GSYJ-512
730	10 Ω resistor	1	Panasonic Industrial Co. (Div. Of Matsushita Electric Corp. of America) (Secaucus, NY). ERJ-3GSYJ-100	ERJ-3GSYJ-100
722	120 kΩ resistor	1	Panasonic Industrial Co. (Div. Of Matsushita Electric Corp. of America) (Secaucus, NY). ERJ-3GSYJ-124	ERJ-3GSYJ-124
704	220 Ω resistor	1	Panasonic Industrial Co. (Div. Of Matsushita Electric Corp. of America) (Secaucus, NY). ERJ-3GSYJ-221	ERJ-3GSYJ-221
744, 746, 749, 754	1000 pF capacitor	4	Surface Mountable Electronic Components, Inc. (Austin, TX) MCCE102K1-NRT1	MCCE102K1-NRT1
741	0.01 μF capacitor	1	NIC Components Corp. (Amityville, NY) NSPC103J50-TRB2	NSPC103J50-TRB2
742	3900 pF capacitor	1	Surface Mountable Electronic Components, Inc. (Austin, TX) MCCE392J-4NO	MCCE392J-4NO
40	3.3 μF capacitor	5	KEMET T491A335K0-10AS	T491A335K0-10AS
745, 760,	0.1 μF capacitor	2	Surface Mountable Electronic Components, Inc. (Austin, TX) MCCE104M-2NU	MCCE104M-2NU
753	22 μF capacitor	1	KEMET T491C226K0-10AS	T491C226K0-10AS
50 751, 752	1000 pF capacitor	2	Panasonic Industrial Co. (Div. Of Matsushita Electric Corp. of America) (Secaucus, NY). ECU-V1H102JCX	ECU-V1H102JCX
55 758	39 pF capacitor	1	Surface Mountable Electronic Components, Inc. (Austin, TX) MCCE390J-1NOT1	MCCE390J-1NOT1
759, 743	27 pF capacitor	1	Surface Mountable Electronic Components, Inc. (Austin, TX) MCCE270J-1NOT1	MCCE270J-1NOT1
60	0.01 μF capacitor	1	Surface Mountable Electronic Components, Inc. (Austin, TX) MCCE103-K2NR	MCCE103-K2NR
65 771	12 μH inductor	1	Pole Zero Corp. (West Chester, OH)	

TABLE 2-continued

Reference Numeral(s)	Description	Quantity	Manufacturer	Manufacturer's Part Number
772	Inductor with wire secondary	1	Pole Zero Corp. (West Chester, OH)	
781-783	NPN transistor	3	ROHM Co., Ltd. (Antioch, TN)	MMST5089
784	N-Channel MOSFET	1	Digi-key (Fairchild)	NDS351-NCTND
797	10 MHz crystal	1	ECS, Inc.	ECS-100-S-5P
795	8 bit Microcontroller	1	Microchip Technology, Inc. (Chandler, AZ)	PIC16F84-101/SO
791, 791	Dual Operational Amplifier	1	Texas Instruments	TLC2272

FIG. 8 is a block diagram of a jamming circuit 44 in accordance with a preferred embodiment of the present invention. The jamming circuit 44 includes an amplifier 801, a tuned circuit 803, and an antenna 805, and is preferably affixed in proximity to the dispenser retainer (e.g., nozzle boot). The amplifier 801 amplifies an input signal 205 representing a jamming code bit sequence received from the transaction controller (card reader interface). The input signal 205 is at a receive frequency of the dispenser transceiver.

The tuned circuit 803 preferably comprises the necessary capacitors, inductors, and resistors to facilitate transmission of the amplified jamming signal. In the preferred embodiment, a single inductor of the tuned circuit 803 serves as the antenna 809. In an alternative embodiment, a resonant circuit, such as the circuit described in detail in U.S. patent application Ser. No. 08/956,732, may be employed as the combination of the tuned circuit 803 and the antenna 805.

The jamming circuit 44 serves two functions. First, the jamming circuit 44 serves to indicate to the associated card reader interface that the dispenser 18 has been returned to the retainer, signaling the completion of a vending transaction. This indication is accomplished through the dispenser transceiver's reception of a unique bit sequence (jamming code) transmitted only by the jamming circuit 44, and not by any receptacle transceiver 50. Second, the jamming circuit 44 functions as disablement device for the receive portion of the dispenser transceiver 22 when the dispenser 18 is placed in its retainer (e.g., nozzle boot 48) and no vending transaction is taking place. The disablement occurs as a result of the jamming circuit 44 radiating emissions dominating the receive portion of the dispenser transceiver 22. Such disabling of the receive portion of the dispenser transceiver 22 is desired to prevent the dispenser transceiver 22 from erroneously receiving billing information from other receptacle transceivers 50 that may either be engaged in vending transactions with other dispenser transceivers 22 or be periodically transmitting from vehicles that are simply passing or are parked nearby the vending machine.

FIG. 9 is a logic flow diagram 900 illustrating steps executed by a card reader interface 30 to generate a control signal to enable a vending machine to dispense a product in accordance with a preferred embodiment of the present invention. The card reader interface 30 masters the control of the vending transaction in a fixed sequence that is

programmed into a microcontroller. Microcontroller source code, less decryption routines, that may be executed by the card reader interface 30 to perform the logic flow depicted in FIG. 9 is contained in the attached microfiche appendix and is incorporated into the present specification as if fully set forth herein.

The logic flow begins (901) when, upon power up of the card reader interface microcontroller, the card reader interface 30 initializes (903) itself, including its ports and internal variables. After initializing itself, the card reader interface 30 initializes (905) each dispenser transceiver 22 that it controls. The card reader interface 30 conveys a stimulus, in sequential order, to each dispenser transceiver 22. Upon proper response by a dispenser transceiver 22 to the stimulus, the card reader interface 30 identifies the dispenser transceiver 22 as being active, and initializes appropriate constants, if applicable, in the dispenser transceiver 22 via a command process. For example, the card reader interface 30 might convey timing parameter constants to the dispenser transceiver 22 during the initialization phase.

After all active dispenser transceivers 22 have been initialized, the card reader interface 30 enters its normal mode of operation and performs the steps depicted in blocks 907-931. During its normal mode of operation, the card reader interface 30 enters into a polling cycle with respect to each dispenser transceiver 22. That is, the card reader interface 30 polls (907) a first dispenser transceiver and determines (909) whether a receptacle transceiver 50 is present. The polling command instructs the dispenser transceiver 22 to transmit an interrogation signal during a first time period (e.g., 135 milliseconds) and, upon termination of the first time period, receive signals, such as an acknowledgment of receipt of the interrogation signal, during a second time period (e.g., 35 milliseconds). Upon expiration of the second time period, the dispenser transceiver 22 demodulates the received signals to recover any received data and forwards the data to the card reader interface 30. The card reader interface 30 then correlates the received data with a predetermined acknowledgment sequence to determine whether an acknowledgment was received and, therefore, whether a receptacle transceiver 50 is present.

If no receptacle transceiver is present in the coverage area of the first dispenser transceiver 22, the card reader interface 30 sequentially polls (925, 929) each other dispenser transceiver 22 in a similar manner. If no receptacle transceiver 50 is present at any of the dispenser transceivers 22, the polling process restarts at block 907. However, if a receptacle transceiver 50 is determined (909, 927, 931) to be present during any polling cycle, the card reader interface 30 commences communication with the respective receptacle transceiver 50, which, at a minimum, encompasses initializing (911) a download of billing information (e.g., credit or debit card account number) for a consumer to be charged for the product from the receptacle transceiver 50, for example by deactivating jamming circuit 44 transmissions to improve the environment for dispenser transceiver reception or transmitting a predetermined query sequence, and receiving (913) the billing information. In the preferred embodiment, the card reader interface 30 and the receptacle transceiver 50 enter into a communications protocol via the dispenser transceiver 22, which protocol includes exchanging encrypted data, data parity checks, and acknowledgment handshaking.

Upon receiving the billing information, the card reader interface 30 decompresses and decodes (915) the account number and reformats it for transmission to the vending site card reading device 35 or Point of Sale (POS) computer. In

the preferred embodiment, the receptacle transceiver 50 compresses the billing information prior to transmission to enable such information to be transmitted in a shorter period of time, thereby saving battery life. To compress the billing information, the receptacle transceiver 50 preferably represents a group of digits by a single binary symbol in accordance with known techniques, thereby making more efficient use of binary symbols. After extracting the account information, the card reader interface 30 seizes (917) control of the card receptacle 32 control lines utilizing a multiplexer and conveys the account information to the POS computer using a format that emulates (919) a manual swipe of a customer's credit or debit card in the card receptacle 32.

Once the account information has been reliably conveyed to the POS processor and authorization for the transaction has been received, the card reader interface releases (921) the card receptacle control lines, allowing normal operation of the card receptacle and thereby effectively generating a control signal enabling the dispenser to dispense the product. That is, in the preferred embodiment, the card reader interface 30 provides a stimulus (account information) for allowing the card reading device 35 and its associated circuitry to engage in normal routines to interact with the vending device's conventional dispensing control electronics and valving (not shown) to either enable or disable dispensing. Thus, in the preferred embodiment, the card reader interface indirectly enables or disables dispensing of the product. In an alternative embodiment, upon receiving authorization for the transaction from the POS computer, the card reader interface 30 might directly interact with the vending device's conventional dispensing control electronics and valving to enable or disable dispensing.

After completion of the billing information transfer, the card reader interface 30 may engage in one or more of a variety of activities, such as ceasing communication with the receptacle transceiver 50 or continuing communication with the receptacle transceiver 50 for the purpose of affirming the proximity of the receptacle transceiver 50, uploading additional information (e.g., a new account number) to the receptacle transceiver 50, or downloading information from the receptacle transceiver 50.

After the card reader interface 30 has ceased communication with the receptacle transceiver 50, the card reader interface 30 determines (923) whether a jamming circuit 44 is proximate. That is, the card reader interface 30 provides the jamming code to the jamming circuit 44 for transmission, if the card reader interface 30 had previously removed such code, and determines whether the dispenser transceiver 22 has received the jamming signal to indicate that the dispenser 18 has been returned to its retainer (e.g., nozzle boot 48). When no jamming signal is detected, the card reader interface 30 continues searching for such a signal. When a jamming signal is detected, the card reader interface 30 acknowledges completion of the vending transaction and resumes execution the dispenser transceiver 50 polling cycles as described above.

In addition to the circuitry and system blocks discussed above with respect to FIGS. 2-9, the preferred vending system also includes an intrinsic safety circuit (not shown) utilized in the cable connection between the card reader interface 30 and the dispenser transceiver 22. The intrinsic safety circuit is designed to meet requirements set forth by the Underwriters Laboratories which prescribe the measures to be taken to ensure intrinsic safety of electrical devices in a fuel dispenser. The intrinsic safety requirements provide for voltage and current limiting on any electrical conductor that enters or passes through the designated fuel vapor

region(s) of a fuel dispenser. The intrinsic safety circuitry is well known in the art and fundamentally comprises a circuit containing shunt diodes for voltage limiting and series resistors and/or fuses for current limiting.

FIG. 10 is a logic flow diagram 1000 illustrating steps executed by a transmitting device to transmit digital information from a substantially electrically shielded enclosure, or other substantially electrically shielded environment, in accordance with a preferred embodiment of the present invention. The logic flow begins (1001) when the transmitting device generates (1003) a constant frequency signal. In the preferred embodiment, the constant frequency signal is a sinusoid at a frequency of approximately 8.192 kilohertz. However, any constant frequency signal having a center frequency of about ten kilohertz or less may be used.

Once the constant frequency signal is generated, the transmitting device phase modulates (1005) the constant frequency signal to represent digital information to be transmitted. That is, the transmitting device varies an instantaneous phase of the constant frequency signal over a period of time to represent the digital information to be transmitted. In the preferred embodiment, the transmitting device applies two phase transitions during any one bit transmission period to represent a bit of digital information. Accordingly, the transmitting device transitions the phase of the constant frequency signal from a first phase (e.g., 0 degrees) to a second phase (e.g., 270 degrees) during a first portion (e.g., first half) of the bit transmission period and then transitions the phase of the constant frequency signal from the second phase (270 degrees) to a third phase (e.g., 180 degrees) during a second portion (e.g., second half) of the bit transmission time period. In the preferred embodiment, the transmitting device represents a binary "zero" by transitioning the phase of the constant frequency signal in a clockwise direction (with respect to a phasor representation of the constant frequency signal) through two phase transitions per bit transmission time period. Similarly, in the preferred embodiment, the transmitting device represents a binary "one" by transitioning the phase of the constant frequency signal counterclockwise through two phase transitions per bit transmission time period. In an alternative embodiment, the transmitting device may transition the phase of the constant frequency signal through more than two phase transitions during any one bit transmission time period to represent the respective bit to ultimately be transmitted. The number of phase transitions during any particular bit transmission period is determined based on the amount of subsequent filtering and averaging employed to disperse the FM impulse response resulting from the instantaneous phase transitions, and the effective FM deviation desired. In the preferred embodiment, two phase transitions were found to be sufficient when both the transmitting device and the receiving device incorporated the aforementioned tuned resonant circuits to average and spread the frequency response.

Once the phase modulated signal is produced, the transmitting device averages (1007) the phase modulated signal to simulate an FM signal. As briefly mentioned above, the transmitting device preferably employs a tuned resonant circuit to filter, and thereby average, the phase modulated signal. The tuned resonant circuit employed in the preferred embodiment may suitably comprise a resonant circuit and drive circuit, such as those described in co-pending, commonly-assigned U.S. patent application Ser. No. 08/956,732. The transmitting device then transmits (1009) the simulated FM signal, and the logic flow ends (1011).

The transmitting device transmits the simulated FM signal primarily via a magnetic field at a carrier frequency of about

ten kilohertz or less. In the preferred embodiment, a carrier frequency of 8.192 kilohertz is used. The use of both a low frequency carrier and magnetic coupling allows the transmitting signal to escape substantially electrically shielded enclosures, such as automobile trunks, automobile hoods, or automobile fuel inlets, and provides for a fairly well constrained transmission range due to the mathematical relation that magnetic coupling decreases in proportion to the cube of the distance from the magnetic source. The transmission range of the transmitting device in the preferred embodiment remains nearly constant regardless of whether the transmitting device is transmitting from a shielded enclosure or not due to its use of magnetic coupling to convey the information. By contrast other wireless radio frequency identification (RFID) systems, such as the "SPEEDPASS" fuel vending system, utilize high frequency electromagnetic transmissions which have varying ranges due to their use of both electric and magnetic fields to convey a signal. In order for a transmitting device using both electric and magnetic fields to transmit from an electrically shielded enclosure, a high power transmitter must be employed to generate a magnetic field component strong enough to be detected outside the shielded enclosure. However, when such a high power transmitter is employed and the shielded enclosure is temporarily removed (e.g., when a trunk is open), the transmission range of the transmitter increases dramatically because the shielding is removed and both the electric and magnetic fields convey information. Furthermore, by using a method as described in blocks 1003-1009 to generate the signal to be transmitted, the complex circuitry typically required for FM modulation is not necessary; thus, inexpensive, small scale integrated (SSI) circuits can be used to produce the simulated FM signal.

FIG. 11 is a logic flow diagram 1100 illustrating steps executed by a receiving device to receive digital information, such as that generated and transmitted in accordance with FIG. 10. The logic flow begins (1101) when the receiving device, which is preferably located outside the substantially electrically shielded environment, receives (1103) the simulated FM signal from the transmitting device. The receiving device averages (1105) the received signal using a tuned resonant circuit, such as the resonant circuit and drive circuit described in U.S. patent application Ser. No. 08/956,732, to more closely emulate a true FM signal. Since an FM signal is now effectively present, the receiving device FM detects (1107) the transmitted digital information from the averaged signal, and the logic flow ends (1109). Therefore, in sum, by using the novel signal generation technique described in FIG. 10 and by employing tuned resonant circuits in both the transmitting device and the receiving device, simple microcontroller-based FM detection techniques may be employed in the receiving device to detect the digital information present in the transmitted signal, without requiring complex FM generation circuits to be employed by the transmitting device to produce the original FM signal. By further using low frequency magnetic field transmissions, the present invention permits inexpensive transmission of digital information through electrically shielded enclosures, while maintaining a relatively fixed transmission range under all conditions.

FIG. 12 is a logic flow diagram 1200 illustrating steps executed by a product vending system to vend a product in accordance with the present invention. The logic flow begins (1201) when the product vending system disables (1203) a product dispenser from processing received radio signals. In a preferred embodiment, as described above, the product vending system employs a jamming circuit 44 to produce

jamming signals at a receive frequency of the dispenser's receiver to thereby prevent the receiver from receiving radio signals while the dispenser 18 is in close proximity to the jamming circuit 44. The use of a jamming circuit is preferred over the use of a limit switch, proximity sensor, or other device because a jamming circuit is reliable and requires minimal electrical and mechanical modifications to an existing product vending device (e.g., the jamming circuit can be attached to the external surface of the existing vending device).

In an alternative embodiment, the product vending system's transaction controller may disable power to the dispenser receiver when the dispenser is physically in contact with its retainer 48. For example, one or more limit switch-type electrical contacts could be provided between the dispenser and its retainer when the dispenser is connected to, or placed on or in, its retainer 48. However, such an approach has disadvantages when the dispenser and retainer are intended for use in undesirable environmental conditions, such as outside fuel pump vending machines, that may result in corrosion of electrical contacts and subsequent failing of the disablement circuit. In addition, such an embodiment could result in the false reception of a signal from a receptacle receiver 50 located on the side of the product vending machine opposite the side on which the dispenser transceiver 22 is responsible for servicing.

The product vending system determines (1205) a parameter associated with each received radio signal. When the dispenser 18 is in close proximity to the jamming circuit 44, the dispenser receiver receives a jamming code from the jamming circuit 44 and the product vending system determines that no vending is to take place. However, when the dispenser 18 is moved in close proximity to a receptacle 51 of the product to be vended, the product vending system determines that another signal is now being received and determines a parameter of the newly received radio signal.

In the preferred embodiment, the signal parameter determined by the vending system is signal strength because once the signal strength of the radio signal detected by the product vending device is strong enough to overcome the signal strength of the jamming signal, the product vending device can detect the presence of a receptacle transmitter or transceiver 50, thereby indicating that vending may need to take place. Thus, upon determining the parameter of the received signal, the product vending system determines (1207) whether a receptacle for the product is within a predetermined proximity of the dispenser 18. In the preferred embodiment, this determination is made when the dispenser 18 is in sufficient proximity of the fuel inlet 51 to receive a signal from the receptacle transceiver 50 mounted in physical proximity to the fuel inlet 51. The product vending system thus determines that the receptacle 51 is in a predetermined proximity of the dispenser 18 based on the signal strength of the signals received by a receiver (e.g., a receive portion of the dispenser transceiver 22) of the product vending system. That is, as discussed above, when only the jamming signal is detectable (i.e., has a strong enough signal strength to prevent reception of any other signals at the dispenser receiver), the product vending system presumes that the receptacle 51 is not within a predetermined proximity of the dispenser 18; whereas, when the radio signal transmitted by a transmitting device (e.g., a transmit portion of the receptacle transceiver 50) in or near the receptacle is detectable (i.e., has a sufficient signal strength to be detected over the jamming signal), the product vending system determines that the receptacle 51 is within sufficient proximity of the dispenser 18 (in the preferred embodiment, less than two meters) to permit vending of the product.

When the receptacle 51 is not within sufficient proximity of the dispenser 18 to permit vending of the product, the logic flow returns to block 1203 and the dispenser 18 remains disabled. However, when the receptacle 51 is within sufficient proximity of the dispenser 18 to enable vending of the product, the product vending system determines (1209) whether the received radio signal satisfies at least one predetermined condition relating to a product vending transaction. For example, when the product vending system receives a signal that is not a jamming signal, the product vending system determines whether the received signal includes billing information for a consumer to be charged for the product. That is, the product vending system determines whether the received radio signal includes a credit card account number, a debit card account number, or some other account number to facilitate payment for the product to be vended. In addition to determining whether or not the radio signal at least includes billing information, the product vending system also preferably determines the validity of billing the account provided in the radio signal, for example by determining whether the radio signal also includes information related to the expiration date of the account (e.g., an expiration date of a credit card).

If a received radio signal does not satisfy all the necessary predetermined conditions (e.g., does not include a billing account number and/or does not include a valid expiration date), the logic flow returns to block 1203 and the dispenser 18 remains disabled. However, in the event that the radio signal does satisfy all the necessary predetermined conditions, the product vending system generates a signal to enable (1211) the product dispenser 18 to dispense the product to the receptacle 51, and the logic flow ends (1213).

FIG. 13 is a logic flow diagram 1300 illustrating steps executed to acquire a product from a vending device in accordance with the present invention. The logic flow begins (1301) when a transmitter or transceiver apparatus located in, near, or substantially adjacent to a receptacle for the product stores (1303) billing information in a memory device, such as a read-only memory, a random access memory, or any other memory device. Some time after the billing information is stored in the memory device, the apparatus generates (1305) a radio signal that includes the billing information. In a preferred half-duplex embodiment, the radio signal is generated in response to an interrogation signal that requests the billing information. Such a half-duplex system is described in more detail below with respect to FIGS. 15 and 16. In an alternative simplex system, the apparatus continually or periodically generates the radio signal. In the preferred embodiment, the billing information is encrypted during generation of the radio signal using any one of a variety of known encryption techniques to prevent unintended receivers from receiving such critical information of a consumer.

Once the radio signal is generated, the apparatus transmits (1307) the radio signal from a transmitter (e.g., a transmit portion of the receptacle transceiver 50) locatable within a substantially electrically shielded enclosure physically associated with (e.g., adjacent to) the receptacle 51 for the product. In the preferred embodiment, the radio signal is generated and transmitted in accordance with the method described above with respect to FIG. 10. Additionally, in the preferred vending system discussed above with respect to FIG. 1, the transmitter is located in the trunk of a vehicle substantially adjacent to the receptacle or fuel inlet 51 for receiving fuel from a fuel dispenser 18.

Subsequent to transmitting the radio signal, provided all analysis of the billing information was acceptable, the receptacle receives (1309) the product, and the logic flow ends (1311).

FIG. 14 is a logic flow diagram 1400 illustrating steps executed in a product vending system to vend a product in accordance with the present invention. The logic flow begins (1401) when a consumer or an attendant positions (1403) a receiver (e.g., a receive portion of the dispenser transceiver 22) associated with the product dispenser 18 proximate to a transmitter (e.g., a transmit portion of the receptacle transceiver 50) located in or substantially near a receptacle 51 for the product. The receiver must be positioned sufficiently close to the transmitter to permit the receiver to receive a radio signal from the transmitter. However, in a preferred embodiment in which the radio signal is conveyed via a low frequency (about ten kilohertz or less) magnetic field and in which the transmitter is located substantially adjacent to the receptacle, the consumer need only position the dispenser in or near the receptacle (as the consumer would ordinarily do anyway) to allow the receiver to receive the radio signal transmitted by the transmitter.

Once the receiver is positioned appropriately, the receiver receives (1405) the radio signal from the transmitter, wherein the transmitter is located within a substantially electrically shielded enclosure adjacent to a receptacle of the product. Upon receiving the radio signal from the transmitter, the receiver demodulates the transmitted signal to recover the digital information included therein and provides the digital information to a transaction controller of the product vending system. The transaction controller then determines (1407) whether the radio signal included billing information for a consumer to be charged for the product. The vending system's transaction controller makes this determination by comparing the digital information provided by the receiver to stored account numbers in a centralized computer database. For example, upon receiving a string of bits from a receiver, the transaction controller determines whether those bits correspond to a credit card account number, a debit account number or some other bank account number and determines further whether the bits contain account validity information, such as credit card expiration date. In the preferred embodiment, transaction controller determines whether the radio signal includes billing information by extracting the bit sequence from the radio signal with the assistance of the receiver and determining whether the bit sequence correlates to a predetermined bit sequence. That is, the transaction controller uses well known correlation techniques to effectively compare the bit sequence of the radio signal with other known bit sequences, such as credit card account numbers, debit card account numbers or other bank account numbers. When the bit sequence correlates to one of the predetermined bit sequences, transaction controller determines that the radio signal does indeed include billing information for a consumer to be charged for the product.

When the radio signal does not include billing information, no product is dispensed and the logic flow ends (1413). However, when the radio signal does include billing information, the transaction controller extracts the billing information and determines (1409) whether the billing information satisfies one or more predetermined conditions as discussed above with respect to FIG. 12. That is, the transaction controller determines whether the billing information is valid (e.g., by checking account validity information contained in the radio signal or by verifying account validity via a wireline communication with a POS computer as is well known in the art). When the billing information does not satisfy one or more of the predetermined conditions, no product is dispensed, and the logic flow ends (1413). When the billing information does satisfy all the

predetermined conditions, the transaction controller generates (1411) a signal enabling the product dispenser to dispense the product as described above with reference to FIG. 9, and the logic flow ends (1413).

FIG. 15 is a logic flow diagram 1500 illustrating steps executed by a product vending device to vend a product in accordance with the preferred embodiment of the present invention. The logic flow begins (1501) when the vending device transmits (1503) an interrogation signal that includes a request for billing information of a consumer to be charged for the product vend. Provided that the interrogation signal is received by a transceiver associated with a receptacle for the product, the vending device eventually receives (1505) a radio signal from the transceiving device. Upon reception of the radio signal, the vending device determines (1507) whether the radio signal includes billing information of a consumer to be charged for the product. As discussed above, such a determination is preferably accomplished by extracting a bit sequence (e.g., a preamble, an acknowledgment, or an account number) from the radio signal and determining whether the bit sequence correlates to a predetermined bit sequence. In a preferred embodiment, the vending device and the transceiving device associated with the receptacle for the product utilize a preestablished protocol in which a preamble is included at the beginning of the bit stream transmitted by the transceiving device in response to the interrogation signal. Accordingly, the vending device, upon receiving the radio signal, correlates the preamble (e.g., first 16 bits of the bit stream) extracted from the radio signal with a preamble stored in a memory of the vending device. When the received preamble correlates to the predetermined preamble (e.g., when a magnitude of the correlation between the received preamble and the predetermined preamble exceeds a predetermined magnitude threshold), the vending device determines that the radio signal includes billing information of the consumer.

If the radio signal does not include billing information of the consumer, no product is dispensed, and the logic flow ends (1513). However, if the radio signal does include billing information for a consumer, the vending device determines (1509) whether the billing information satisfies one or more predetermined conditions. That is, once the vending device determines that the radio signal includes billing information via the preamble, the vending device determines whether some or all of the remaining bits of the received bit stream meet certain other criteria, such as being a valid account number and/or indicating a valid expiration date for the account. For example, the vending device upon determining that the radio signal includes billing information might examine the next set of bits to determine whether they satisfy a known mathematical algorithm used by credit and debit card issuers to verify valid account numbers. In the preferred embodiment, the vending device performs this account verification by processing the bits, extracting the account digits, and sending the account number to a particular creditor (also identified in the bit stream represented by the radio signal) for verification. A similar process might be used to verify account expiration date.

If the billing information does not satisfy the predetermined conditions (e.g., does not indicate a valid account number and/or a valid expiration date), no product is dispensed, and the logic flow ends (1513). If the billing information does satisfy the predetermined conditions, the vending device dispenses (1511) the product to the receptacle for the product, and the logic flow ends (1513). Therefore, as described above with respect to blocks 1501–1513, the present invention provides a half duplex

system for facilitating cashless vending of products. In sharp contrast to the prior art, such as the "SPEEDPASS" fuel vending system, which provides for simplex operation only (i.e., only a receiver at the vending device and only a transmitter associated with the consumer for the product), the present invention provides a more secure and efficient vending system by requiring transmission of critical information, such as a consumer's credit card number, only in response to a request for such information from the vending device from which a product is desired, instead of continuous transmission of the information as in the prior art. Improved efficiency results from the use of a half duplex system because transmitters, which generally consume the largest amount of power in a transceiver, only need to operate for one short period of time responsive to a request for information.

FIG. 16 is a logic flow diagram 1600 illustrating steps executed to acquire a product from a vending device in accordance with a preferred embodiment of the present invention. The logic flow begins (1601) when a transceiver associated with, and preferably adjacent to, a receptacle for the product receives (1603) an interrogation signal from the vending device that includes a request for billing information for a consumer to be charged for the product. Responsive to the interrogation signal, the transceiver transmits (1605) a radio signal that includes the billing information. In the preferred embodiment, the radio signal is generated in accordance with the method described above with respect to FIG. 10. Provided that the vending device receives and satisfactorily processes the radio signal, the receptacle for the product receives (1607) the product from the vending device, and the logic flow ends (1609).

While the foregoing constitute certain preferred and alternative embodiments of the present invention, it is to be understood that the invention is not limited thereto and that in light of the present disclosure, various other embodiments will be apparent to persons skilled in the art. Accordingly, it is to be recognized that changes can be made without departing from the scope of the invention as particularly pointed out and distinctly claimed in the appended claims which shall be construed to encompass all legal equivalents thereof.

What is claimed is:

1. A method for vending a product from a dispenser to a receptacle for the product, the method comprising the steps of:

disabling the dispenser from processing a received radio signal until the receptacle is located within a predetermined proximity of the dispenser, said step of disabling comprising the step of transmitting a jamming signal to inhibit reception of the radio signal until the receptacle is within the predetermined proximity of the dispenser; and

enabling the dispenser to dispense the product in response to reception of at least one said radio signal that satisfies at least one predetermined condition relating to a product vending transaction.

2. The method of claim 1, further comprising the step of determining that the receptacle is located within the predetermined proximity of the dispenser based on a parameter associated with the radio signal.

3. The method of claim 2, wherein the parameter associated with the radio signal comprises a signal strength of the radio signal sufficient to permit reception of the radio signal at the dispenser.

4. A method for vending a product from a product dispenser, the method comprising the steps of:

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transmitting a radio signal, by a first transmitter locatable within a substantially electrically shielded environment physically associated with a receptacle for the product, the radio signal representing billing information of a consumer to be charged for the product;

positioning a receiver associated with the product dispenser in sufficient proximity to the first transmitter to permit the radio signal to be received by the receiver; determining whether the billing information satisfies at least one predetermined condition;

generating a signal that enables the product dispenser to dispense the product in response to determining that the billing information satisfies the at least one predetermined condition and

transmitting, by a second transmitter located in a predetermined proximity of the product dispenser, a jamming signal that prevents the receiver from receiving the radio signal when the receiver is in proximity of the second transmitter.

5 5. The method of claim 4, wherein the step of transmitting a radio signal comprises the step of transmitting the radio signal responsive to the reception of an interrogation signal that includes a request for the billing information.

6 6. The method of claim 5, further comprising the step of receiving, by a receiver located within the substantially electrically shielded environment, the interrogation signal from a second transmitter associated with the product dispenser prior to the step of transmitting the radio signal.

7 7. The method of claim 4, further comprising the step of transmitting, by a second transmitter associated with the product dispenser, an interrogation signal, the interrogation signal including a request for billing information.

8 8. The method of claim 7, wherein the step of transmitting an interrogation signal comprises the step of repeatedly transmitting the interrogation signal.

9 9. The method of claim 4, wherein the step of transmitting a radio signal comprises the steps of:

generating a constant frequency signal;

producing a phase modulated signal by varying a phase of the constant frequency signal over a period of time to represent the billing information;

averaging the phase modulated signal to produce a simulated frequency modulated signal; and

transmitting the simulated frequency modulated signal.

10 10. The method of claim 9, wherein the billing information consists of a plurality of bits and wherein the step of producing a phase modulated signal comprises the steps of:

transitioning from a first phase to a second phase during a first portion of a bit transmission period; and

transitioning from the second phase to a third phase during a second portion of the bit transmission period, thereby representing one bit of the billing information as at least two phase transitions.

11 11. The method of claim 4, wherein the step of transmitting a radio signal comprises the step of transmitting the radio signal primarily via a magnetic field at a carrier frequency of about ten kilohertz or less.

12 12. The method of claim 4, further comprising the step of encrypting the billing information prior to the step of transmitting a radio signal.

13 13. A method for a product dispenser to vend a product to a consumer, the method comprising the steps of:

receiving a radio signal from a transmitter located within a substantially electrically shielded environment physically associated with a receptacle for the product;

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determining whether the radio signal includes billing information for a consumer to be charged for the product;

in response to determining that the radio signal includes billing information, determining whether the billing information satisfies at least one predetermined collection;

generating a signal that enables the product dispenser to dispense the product in response to determining that the billing information satisfies the at least one predetermined condition, and

receiving a jamming signal that prevents the product dispenser from receiving the radio signal when the product dispenser is not in sufficient proximity to the transmitter.

14. The method of claim 13, further comprising the step of positioning the product dispenser in sufficient proximity to the transmitter to permit reception of the radio signal prior to the step of receiving a radio signal.

15. The method of claim 13, further comprising the step of transmitting an interrogation signal prior to the step of receiving a radio signal, the interrogation signal including a request for the billing information.

16. The method of claim 15, wherein the step of transmitting an interrogation signal comprises the step of repeatedly transmitting the interrogation signal.

17. The method of claim 16, wherein the step of determining whether the radio signal includes billing information comprises the steps of:

extracting a bit sequence from the radio signal; determining whether the bit sequence correlates to a predetermined bit sequence; and

in response to determining that the bit sequence correlates to a predetermined bit sequence, determining that the radio signal includes billing information for a consumer to be charged for the product.

18. The method of claim 13, wherein the billing information comprises a plurality of bits, the method further comprising the step of detecting each bit of the billing information based on at least one phase variation of the radio signal.

19. The method of claim 13, wherein the step of receiving a radio signal comprises the step of receiving the radio signal at a receiver positioned outside the substantially electrically shielded environment.

20. A method for a product receptacle to acquire a product from a product dispenser, the method comprising the steps of:

storing billing information for a consumer to be charged for the product;

generating a radio signal that includes the billing information; transmitting

the radio signal from a transmitter located within a substantially electrically shielded environment physically associated with the product receptacle;

transmitting a jamming signal operable to inhibit reception of the radio signal until the receptacle is within sufficiently close proximity of the dispenser as to enable the radio signal to be received notwithstanding said jamming signal, and

acquiring the product from the product dispenser into the receptacle responsive to reception of the radio signal.

21. The method of claim 20, wherein the step of generating the radio signal further comprises the step of encrypting the billing information.

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22. The method of claim 20, further comprising the step of receiving an interrogation signal from the product dispenser prior to the step of generating a radio signal, the interrogation signal including a request for the billing information.

23. The method of claim 20, wherein the step of generating a radio signal comprises the steps of:

- generating a constant frequency signal;
- varying a phase of the constant frequency signal over a period of time to represent the billing information, thereby producing a phase modulated signal; and
- averaging the phase modulated signal to produce a simulated frequency modulated signal.

24. The method of claim 23, wherein the billing information is represented by a plurality of bits and wherein the step of varying a phase of the constant frequency signal comprises the steps of:

- transitioning from a first phase to a second phase during a first portion of a bit transmission period; and
- transitioning from the second phase to a third phase during a second portion of the bit transmission period, thereby representing one bit of the billing information as at least two phase transitions.

25. The method of claim 20, wherein the step of transmitting the radio signal comprises the step of transmitting the radio signal primarily via a magnetic field at a carrier frequency of about ten kilohertz or less.

26. A method for dispensing a product from a product dispenser into a receptacle, the method comprising the steps of:

- storing billing information for a consumer to be charged for the product;
- generating a radio signal that includes the billing information;
- transmitting the radio signal from a transmitter located within a substantially electrically shielded environment physically associated with the product receptacle;
- transmitting, from a location other than one within said environment, a jamming signal operable to inhibit reception of the radio signal until the receptacle is within sufficiently close proximity of the dispenser as to enable the radio signal to be received notwithstanding the jamming signal;
- receiving the radio signal outside the substantially electrically shielded environment; and
- enabling the product to be dispensed in response to receiving the radio signal.

27. The method of claim 26, wherein the step of generating the radio signal further comprises the step of encrypting the billing information.

28. The method of claim 26, further comprising the step of receiving an interrogation signal from the product dispenser prior to the step of generating a radio signal, the interrogation signal including a request for the billing information.

29. The method of claim 26, wherein the step of generating a radio signal comprises the steps of:

- generating a constant frequency signal;
- varying a phase of the constant frequency signal over a period of time to represent the billing information, thereby producing a phase modulated signal; and
- averaging the phase modulated signal to produce a simulated frequency modulated signal.

30. The method of claim 29, wherein the billing information is represented by a plurality of bits and wherein the

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step of varying a phase of the constant frequency signal comprises the steps of:

- transitioning from a first phase to a second phase during a first portion of a bit transmission period; and
- transitioning from the second phase to a third phase during a second portion of the bit transmission period, thereby representing one bit of the billing information as at least two phase transitions.

31. The method of claim 26, wherein the step of transmitting the radio signal comprises the step of transmitting the radio signal primarily via a magnetic field at a carrier frequency of about ten kilohertz or less.

32. A method for a product vending device to vend a product to a receptacle for the product, the method comprising the steps of:

- transmitting an interrogation signal that includes a request for billing information of a consumer to be charged for the product;
- responsive to the interrogation signal, receiving a radio signal;
- determining whether the radio signal includes the billing information;
- in response to determining that the radio signal includes the billing information, determining whether the billing information satisfies at least one predetermined condition;
- enabling the product to be dispensed from the product vending device in response to determining that the billing information satisfies the at least one predetermined condition, and
- transmitting a jamming signal operable to inhibit reception of the radio signal unless the vending device and the receptacle are within sufficiently close proximity of one another to enable the radio signal to be received notwithstanding the jamming signal, and responsive to reception of the radio signal, receiving the product.

33. A method for acquiring a product from a vending device, the method comprising the steps of:

- receiving an interrogation signal from the vending device, the interrogation signal requesting billing information for a consumer to be charged for the product;
- responsive to the interrogation signal, transmitting a radio signal from a transmitter located within a substantially electrically shielded environment physically associated with a product receptacle signal that includes the billing information;

- transmitting, from a location other than one within said environment, a jamming signal operable to inhibit reception of the radio signal until the receptacle is within sufficiently close proximity of the vending device as to enable the radio signal to be received notwithstanding the jamming signal, and

- responsive to reception of the radio signal, receiving the product.

34. An apparatus for controlling dispensing of a product, the apparatus being attachable to a product dispenser, the apparatus comprising:

- a card reading device that, in response to obtaining billing information for a consumer to be charged for the product, provides the billing information to a creditor of the consumer;

- a receiver for receiving a radio signal from a transmitter associated with a receptacle for the product;

- a card reader interface, operably coupled to the receiver and the card reading device, that determines whether

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the radio signal includes billing information for the consumer to be charged and, in response to determining that the radio signal includes the billing information, converts the billing information received from the receiver into a format compatible with the card reading device and generates a control signal to enable the product dispenser to dispense the product, and  
 a jamming circuit, coupled to the card reader interface, that transmits a jamming signal to prevent the receiver from receiving the radio signal until at least a portion of the product dispenser is in sufficient proximity to the receptacle to permit reception of the radio signal.

**35.** The apparatus of claim **34**, further comprising a transmitter, operably coupled to the card reader interface, that transmits, responsive to at least one control signal from the card reader interface, at least one interrogation signal that includes a request for the billing information.

**36.** A system for vending a product from a dispenser to a receptacle for the product, the system comprising:

a transaction controller that generates control signals to facilitate dispensing of the product;  
 a first transmitter, operably coupled to the transaction controller and forming a part of the dispenser, that transmits an interrogation signal responsive to a control signal from the transaction controller, the interrogation

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signal including a request for billing information of a consumer to be charged for the product;  
 a first receiver, locatable in a substantially electrically shielded environment that is physically associated with the receptacle, that receives the interrogation signal;  
 a second transmitter, operably coupled to the first receiver, that transmits a radio signal responsive to receipt of the interrogation signal, the radio signal including the billing information;  
 a second receiver, operably coupled to the transaction controller, that receives the radio signal, demodulates the radio signal to recover the billing information, and provides the billing information to the transaction controller, and  
 a jamming circuit located substantially adjacent to a retainer of the dispenser, that generates and transmits a jamming signal to prevent the second receiver from receiving the radio signal when the dispenser is positioned proximate to the retainer.

**37.** The apparatus of claim **36**, wherein the product is fuel and wherein the receptacle for the product is a portion of a motorized vehicle.

\* \* \* \* \*

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of: Jeffry Jovan Philyaw

Serial No.: 09/642,891

Confirmation No.: 8887

Filed: August 21, 2000

Group: 2161

Examiner: Paul H. Kang

For: RETRIEVING PERSONAL ACCOUNT INFORMATION FROM A  
WEB SITE BY READING A CREDIT CARD

Mail Stop AF  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

**AMENDMENT AND RESPONSE TO OFFICE ACTION**

This communication is responsive to the Examiner's Office Action mailed May 18, 2006.

Amendments to the Claims are reflected in the listing of claims beginning on page 2 of this paper.

Remarks/Arguments begin on page 7 of this paper.

## In the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claim 1 (Previously Presented) : A method of accessing personal account information of a credit card associated with a user over a global communication packet-switched network, comprising the steps of:

at a user location disposed on the network, -resolving a machine-resolvable code  
5 (MRC) having coded information contained therein and disposed on the credit card of the user, the coded information having no personal information contained therein relating to the user or routing information over a network;

extracting the coded information from the MRC, the coded information associated with routing information that is associated with both the personal account information of the  
10 user and a specific and unique credit card company server having stored thereat the personal account information of the user;

in response to the steps of resolving and extracting, obtaining the routing information to the credit card server associated with the extracted coded information;

connecting the user location to the specific and unique credit card company server  
15 across the network over a determined route in accordance with the obtained routing information;

transmitting the extracted coded information to the specific and unique credit card company server over the determined route during the step of connecting;

using the transmitted coded information at the specific and unique credit card company server to determine the personal account information associated with the extracted  
20 coded information;

returning the determined personal account information from the specific and unique credit card company server to the user location; and

presenting the determined personal account information to the user at the user location.

Claim 2 (Original): The method of Claim 1, wherein the MRC is optical indicia.

Claim 3 (Original): The method of Claim 2, wherein the optical indicia is a bar code.

Claim 4 (Original): The method of Claim 1, wherein the routing information in the step of obtaining is stored on a user computer at the user location such that the coded information in the step of extracting is used to obtain the corresponding routing information from the user computer.

Claim 5 (Previously Presented): The method of Claim 4, wherein the user computer stores a plurality of coded information each associated with unique routing information such that reading of the MRC of a select one of one or more credit cards of the user causes the user computer to connect to the corresponding specific and unique credit card company server over  
5 the network.

Claim 6 (Previously Presented): The method of Claim 1, wherein the step of resolving utilizes a reading device which is a wireless scanner which transmits the coded information to a user computer at the user location via a receiving device operatively connected to the user computer.

Claim 7 (Original): The method of Claim 1, wherein personal account information in the step of presenting is displayed on a computer display operatively connected to a user computer at the user location.

Claim 8 (Previously Presented): The method of Claim 1, wherein the routing information in the step of obtaining comprises a network address of the specific and unique credit card company server on the network and file path information which locates the personal account information of the user on the specific and unique credit card company server.

Claim 9 (Previously Presented): A method for accessing personal information from a remote location on a network, comprising the steps of:

reading at a user location on the network a unique information access code disposed on a portable access device that is carried by a user, which unique information access

5 code is uniquely associated with both routing information on the network to the remote location and with personal information at the remote location of a user that is associated with the portable access device, wherein the association of the remote location with the unique information access code is unique to such unique information access code such that only that single remote location contains the associated personal information;

10 obtaining the routing information from a database by comparing the unique information access code in a matching operation to a record in the database to determine if there exists in the record a pre-association between the unique information access code and at least one routing information and, if so, then allowing access to such matching routing information;

15 accessing the remote location in accordance with the obtained routing information;

transmitting to the remote location the unique information access code; and at the remote location, receiving the unique information access code and accessing personal information associated therewith and forwarding the personal information back to the user location for viewing by the user, the step of forwarded comprising:

20 sending from the remote location a request for personal identification after determining that there is contained in the database local to the remote location personal information associated with the unique information access code,

25 entering the personal identification information at the user location, and

in response to input of a personal identification information by the user, returning the personal information to the user location.

Claim 10 (Original): The method of Claim 9, wherein the network is a global communication network.

Claim 11 (Original): The method of Claim 9, wherein the portable access device comprises a card that is typically utilized for credit transactions.

Claim 12 (Previously Presented): The method of Claim 9, wherein the step of obtaining and accessing comprises the steps of:

in response to the step of reading, accessing an intermediate location on the network remote from the user location;

5 transmitting the unique information access code to the intermediate location from the user location;

the intermediate having contained thereat the database with associations between a plurality of unique information access codes and associated unique routing information to associated remote locations on the network;

10 comparing the received unique information access code with the stored unique information access codes;

if a match is found, returning the matched unique routing information to the user location; and

utilizing the returned unique routing information from the intermediate location to  
15 access the remote location.

Claims 13 - 24 (Canceled)

## REMARKS

Applicant has carefully reviewed the Office Action dated May 18, 2006. Reconsideration and favorable action is respectfully requested.

The Examiner has basically withdrawn the rejection in the previous case of *Parry* in view of *Janning* as it is a typographical error. The Examiner has made this withdrawal to clarify the record but has basically reiterated all rejections in the case.

In addition, the Examiner has made some comments with respect to the arguments Applicant provided for the rejection of *Perkowski* in view of *Borecki*.

The Examiner's objections were primarily set forth in paragraph 4. In paragraph 4, the Examiner indicated that the deficiency in *Perkowski* is the application of this system to a credit card based system. The Examiner stated that "*Borecki* teaches a network based system for retrieving personal account information." Although noting that Applicant's distinction was that the MRC as required by the prior art requires two purposes, one for being associated with a secure server and one for being associated with personal account information and that distinction, as set forth by the Examiner, is not persuasive to the Examiner. The Examiner's basis was that "the claim language does not *preclude* an MRC having both account identifying information as well as authentication information." Applicant believes that this is an incorrect standard for showing a motivation, suggestion or teaching to combine two references.

It is well settled that, in order to properly reject a claim for obviousness, the PTO must first establish a *prima facie* case. Once the PTO has established such a *prima facie* case, the burden then shifts to the Applicant to provide sufficient evidence of non-obviousness to successfully rebut such a *prima facie* case. One of the more recent cases as set forth by the Federal Circuit is *In re Kahn*, 441 F.3d, 977 (Fed. Cir. 2006), in which the Federal Circuit provided a tutorial on the standards to be applied in determining non-obviousness when

combining references. The Court in *Kahn* noted that most inventions arise from a combination of old elements and that each element may often be found in the prior art. “However, mere identification in the prior art of each element is insufficient to defeat the patentability of the combined subject matter as a whole.” (*Kahn* at 986). It is not the fact that the claim does not preclude the MRC having both accounting identification information as well as authentication information but, rather, the question is whether one skilled in the art would combine these two references. To do this, the Examiner must show that there is a motivation to combine the two references. The Examiner has merely stated that an artisan of ordinary skill in the art having the system of *Perkowski* for remotely and automatically retrieving information related to a coded information would know, when applying the system to a credit card based information retrieval system, to incorporate into the MRC the necessary identifying and authentication information, if required, in order to retrieve that data. There is nothing in *Perkowski* or *Borecki* that in any way suggests such a statement. As such, without some explanation of the Examiner’s position, Applicant believes that a *prima facie* case has not been provided.

In *Kahn*, the Court set forth that, “to establish a *prima facie* case of obviousness based on a combination of elements disclosed in the prior art, the Board must articulate the basis on which it concludes that it would have been obvious to make the claimed invention. *Id.* In practice, this requires that the Board ‘explain the reasons one of ordinary skill in the art would have been motivated to select the references and to combine them to render the claimed invention obvious.’” The court further went on to state that this “entails consideration of both the ‘scope and content of the prior art’ and ‘level of ordinary skill in the pertinent art’ aspects of the Graham test.” (*Kahn* at 986). Applicant believes that the Examiner has not made such a showing and, as such, Applicant believes that the Examiner has not met the *prima facie* standard for showing that there is a motivation, teaching or suggestion to combine these two references.

Applicant has not provided any comments with respect to the remaining rejections, as the rejections in the prior office action have apparently not been addressed by the Examiner. As soon as these are addressed, Applicant will respond accordingly.

Applicant has now made an earnest attempt in order to place this case in condition for allowance. For the reasons stated above, Applicant respectfully requests full allowance of the claims as amended. Please charge any additional fees or deficiencies in fees or credit any overpayment to Deposit Account No. 20-0780/PHLY-25,338 of HOWISON & ARNOTT, L.L.P.

Respectfully submitted,  
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November 20, 2006

LEXSEE 464 F.3D 1286

**ALZA CORPORATION, Plaintiff-Appellant, v. MYLAN LABORATORIES, INC.  
and MYLAN PHARMACEUTICALS, INC., Defendants-Appellees.**

**06-1019**

**UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT**

***464 F.3d 1286; 2006 U.S. App. LEXIS 22616; 80 U.S.P.Q.2D (BNA) 1001***

**September 6, 2006, Decided**

**SUBSEQUENT HISTORY:** Related proceeding at *Alza Corp. v. Impax Labs.*, 193 Fed. Appx. 973, 2006 U.S. App. LEXIS 22800 (Fed. Cir., Sept. 6, 2006)

**PRIOR HISTORY:** [\*\*1] Appealed from: United States District Court for the Northern District of West Virginia. Chief Judge Irene M. Keeley.

*Alza Corp. v. Mylan Labs., Inc.*, 388 F. Supp. 2d 717, 2005 U.S. Dist. LEXIS 22272 (N.D. W. Va., 2005)

**DISPOSITION:** AFFIRMED.

**COUNSEL:** Gregory L. Diskant, Patterson, Belknap, Webb & Tyler LLP, of New York, New York, argued for plaintiff-appellant. With him on the brief were Jeffrey I.D. Lewis, and Richard J. McCormick.

John B. Wyss, Wiley, Rein, & Fielding LLP, of Washington, DC, argued for defendants-appellees. With him on the brief were James H. Wallace, Jr., Kevin P. Anderson, and Robert J. Scheffel.

**JUDGES:** Before GAJARSA, Circuit Judge, CLEVENGER, Senior Circuit Judge, and PROST, Circuit Judge.

**OPINION BY:** GAJARSA

**OPINION**

[\*1288] GAJARSA, *Circuit Judge.*

Alza Corp. ("Alza") appeals from the district court's judgment, after a bench trial, of noninfringement and invalidity of claims 1-3, 11, 13 and 14 of *U.S. Patent No.*

6,124,355<sup>1</sup> ("the '355 patent") in favor of Mylan Laboratories, Inc. and Mylan Pharmaceuticals, Inc. (collectively, "Mylan"). *Alza Corp. v. Mylan Labs., Inc.*, 388 F. Supp. 2d 717 (N.D.W. Va. 2005) ("Alza II"). The infringement arose from Mylan's filing of two Abbreviated New Drug Applications ("ANDAs") for a generic version of the once-a-day extended release [\*\*2] formulation of the anti-incontinence drug oxybutynin, *id. at 720*, which Alza has been marketing as Ditropan XL(R). *Id. at 738*. This court has jurisdiction pursuant to 28 U.S.C. § 1295(a)(1). For the reasons stated below, we affirm the district court's judgment of noninfringement and invalidity.

1 The '355 patent issued to Guittard et al. and was assigned to Alza.

**I. BACKGROUND**

This litigation arose from Mylan's and Impax's filings of ANDAs for once-daily, controlled-release oxybutynin formulations. Oxybutynin is a drug used to treat urinary incontinence. Once-a-day dosing provides the usual benefits of convenience, steady-dosing, and in addition, possibly reduced absorption of a metabolite that leads to side-effects. Claim 2 of the '355 patent is representative.

2. A sustained-release oxybutynin formulation for oral administration to a patient in need of treatment for urge incontinence comprising a therapeutic dose of an oxybutynin selected from the group consisting of oxybutynin and its pharmaceutically acceptable salt that delivers from 0 to 1 mg in 0 to 4 hours,

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from 1 mg to 2.5 mg in 0 [\*\*3] to 8 hours, from 2.75 to 4.25 mg in 0 to 14 hours, and 3.75 mg to 5 mg in 0 to 24 hours for [\*1289] treating urge incontinence in the patient.

col. 17, ll. 31-38 (emphasis added).

The district court construed the '355 patent claims in its *Markman Order*, reported at *Alza Corp. v. Mylan Labs., Inc.*, 349 F. Supp. 2d 1002 (N.D.W. Va. 2004) ("*Alza I*"). The court construed the word "deliver" to refer to the rate of *in vivo* release in the gastrointestinal ("GI") tract. *See id.* at 1019.

Alza did not present direct evidence that Mylan's ANDA formulation released drug in the GI tract at the rates claimed by the '355 patent. However, it did offer two other types of evidence: 1) the rate at which the generic product released oxybutynin in an *in vitro* dissolution apparatus, and 2) the rate at which the ANDA product resulted in the accumulation of oxybutynin in the bloodstream.

The district court found that Alza had failed to meet its burden of proof on infringement. The district court also found the asserted claims of the '355 patent to be invalid as both anticipated and obvious in light of the prior art. For the reasons stated below, we affirm [\*\*4] the invalidity holding on obviousness grounds, and consequently, we do not need to reach Alza's arguments regarding anticipation. We also affirm the holding of noninfringement.

## II. DISCUSSION

### A. Standard of review

Infringement is a question of fact that, after a bench trial, we review for clear error. *See, e.g., Ferguson Beauregard/Logic Controls, Div. of Dover Res., Inc. v. Mega Sys., LLC*, 350 F.3d 1327, 1338 (Fed. Cir. 2003). Under the clear error standard, a reversal is permitted only when this court is left with a definite and firm conviction that the district court was in error. *Medichem, S.A. v. Rolabo, S.L.*, 437 F.3d 1157, 1164 (Fed. Cir. 2006).

As for obviousness, a claimed invention is unpatentable if the differences between it and the prior art are "such that the subject matter as a whole would have

been obvious at the time the invention was made to a person having ordinary skill in the art." 35 U.S.C. § 103(a) (2000); *In re Kahn*, 441 F.3d 977, 985 (Fed. Cir. 2006) (citing *Graham v. John Deere Co.*, 383 U.S. 1, 13-14, 86 S. Ct. 684, 15 L. Ed. 2d 545, (1966)). Obviousness is a question [\*\*5] of law, reviewed *de novo*, based upon underlying factual questions which are reviewed for clear error following a bench trial. *Ruiz v. A.B. Chance Co.*, 357 F.3d 1270, 1275 (Fed. Cir. 2004). These "underlying factual inquiries includ[e]: (1) the scope and content of the prior art; (2) the level of ordinary skill in the prior art; (3) the differences between the claimed invention and the prior art; and (4) objective evidence of nonobviousness." *In re Dembiczak*, 175 F.3d 994, 998 (Fed. Cir. 1999). Similarly, "[t]he presence or absence of a motivation to combine references in an obviousness determination is a pure question of fact," *In re Gartside*, 203 F.3d 1305, 1316 (Fed. Cir. 2000); accord *Winner Int'l Royalty Corp. v. Wang*, 202 F.3d 1340, 1348 (Fed. Cir. 2000), as is the presence or absence of a "reasonable expectation of success" from making such a combination, *Medichem, S.A. v. Rolabo, S.L.*, 437 F.3d 1157, 1165 (Fed. Cir. 2006). Because "a patent retains its statutory presumption of validity, *see* 35 U.S.C. § 282, . . . the movant retains the burden to show the invalidity [\*\*6] of the claims by clear and convincing evidence as to underlying facts." *McGinley v. Franklin Sports, Inc.*, 262 F.3d 1339, 1349 (Fed. Cir. 2001) (internal quotations omitted).

In *Graham*, the Court held that the obviousness analysis begins with several basic factual inquiries: "[(1)] the scope [\*1290] and content of the prior art are to be determined; [(2)] differences between the prior art and the claims at issue are to be ascertained; and [(3)] the level of ordinary skill in the pertinent art resolved." 383 U.S. at 17. After ascertaining these facts, the Court held that the obviousness *vel non* of the invention is then determined "against th[e] background" of the *Graham* factors. *Id.* at 17-18 (emphasis added). Clearly, the Court recognized the importance of guarding against hindsight, as is evident in its discussion of the role of secondary considerations as "serv[ing] to guard against slipping into use of hindsight and to resist the temptation to read into the prior art the teachings of the invention in issue." *Id.* at 36.

The Court of Appeals for the Federal Circuit's and its predecessor's "motivation [\*\*7] to combine" requirement likewise prevents statutorily proscribed hindsight

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reasoning when determining the obviousness of an invention. *Kahn*, 441 F.3d at 986 ("[T]he 'motivation-suggesting-teaching' requirement protects against the entry of hindsight into the obviousness analysis."); *In re Fridolph*, 30 CCPA 939, 942, 134 F.2d 414, 1943 Dec. Comm'r Pat. 350 (1943) ("[I]n considering more than one reference, the question always is: does such art suggest doing the thing the [inventor] did."). According to the "motivation-suggesting-teaching" test, a court must ask "whether a person of ordinary skill in the art, possessed with the understandings and knowledge reflected in the prior art, and motivated by the general problem facing the inventor, would have been led to make the combination recited in the claims." *Kahn*, 441 F.3d at 988 (citing *Cross Med. Prods., Inc., v. Medtronic Sofamor Danek, Inc.*, 424 F.3d 1293, 1321-24 (Fed. Cir. 2005)).

This requirement has been developed consistent with the Supreme Court's obviousness jurisprudence as expressed in *Graham* and the text of the obviousness statute that directs us to conduct the obviousness [\*\*8] inquiry "at the time the invention was made" 35 U.S.C. § 103. As we explained in *Kahn*,

The motivation-suggestion-teaching test picks up where the analogous art test leaves off and informs the *Graham* analysis. To reach a non-hindsight driven conclusion as to whether a person having ordinary skill in the art at the time of the invention would have viewed the subject matter as a whole to have been obvious in view of multiple references, the Board must provide some rationale, articulation, or reasoned basis to explain why the conclusion of obviousness is correct. The requirement of such an explanation is consistent with governing obviousness law . . .

*441 F.3d at 987*. We further explained that the "motivation to combine" requirement "[e]ntails consideration of both the 'scope and content of the prior art' and 'level of ordinary skill in the pertinent art' aspects of the *Graham* test." *Id. at 986*.

At its core, our anti-hindsight jurisprudence is a test that rests on the unremarkable premise that legal determinations of obviousness, as with such

determinations generally, should be based on evidence rather [\*\*9] than on mere speculation or conjecture. Our court's analysis in *Kahn* bears repeating:

A suggestion, teaching, or motivation to combine the relevant prior art teachings *does not have to be found explicitly in the prior art*, as "the teaching, motivation, or suggestion may be implicit from the prior art as a whole, rather than expressly stated in the references. . . . The test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be [\*1291] solved as a whole would have suggested to those of ordinary skill in the art." However, rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be *some* articulated reasoning with *some* rational underpinning to support the legal conclusion of obviousness. This requirement is as much rooted in the Administrative Procedure Act [for our review of Board determinations], which ensures due process and non-arbitrary decisionmaking, as it is in § 103.

*441 F.3d at 987-88* (quoting *In re Kotzab*, 217 F.3d 1365, 1370 (Fed. Cir. 2000)) (citations omitted) (emphases added)). There is [\*\*10] flexibility in our obviousness jurisprudence because a motivation may be found *implicitly* in the prior art. We do not have a rigid test that requires an actual teaching to combine before concluding that one of ordinary skill in the art would know to combine references. This approach, moreover, does not exist merely in theory but in practice, as well. Our recent decisions in *Kahn* and in *Cross Medical Products* amply illustrate the current state of this court's views. See *Kahn*, 441 F.3d at 988 (affirming the PTO's obviousness finding, explaining that a motivation to combine may be found in implicit factors, such as the "knowledge of one of ordinary skill in the art, and [what] the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art"); *Cross Med. Prods.*, 424 F.3d at 1322 (reversing a district court ruling of nonobviousness and explaining that "the motivation to combine need not be found in prior art references, but equally can be found in the knowledge

generally available to one of ordinary skill in the art" such as knowledge of a problem to be solved).

In conclusion, our approach has [\*\*11] permitted us to continue to address an issue of law not readily amenable to bright-line rules, as we recall and are guided by the wisdom of the Supreme Court in striving for a "practical test of patentability." *Graham*, 383 U.S. at 17.

#### B. Description of the technology

The patent at issue is directed generally to an extended release form of oxybutynin. Because the subject matter of the patent falls roughly under the rubric of pharmacology, we give a brief orientation to the field, based upon the record. In general, when a drug is swallowed, it is (1) dissolved in the gastrointestinal ("GI") tract; (2) absorbed from the GI tract into the bloodstream; (3) distributed from the blood into body tissues; and (4) metabolized and eliminated from the bloodstream. The GI tract includes the stomach, small intestine and the colon, and orally administered drugs pass through these portions of the GI tract in turn. Drugs may be administered in different dosage forms,<sup>2</sup> which may include not only the drug itself but also ingredients intended to modulate the rate of release of the drug from the dosage form.

<sup>2</sup> Here we are discussing oral dosage forms, specifically.

[\*\*12] Dosage forms may be described as immediate-release, e.g., such as where the drug is quickly released in the stomach, or as sustained/extended-release, where the drug is slowly released as the formulation traverses the GI tract. The rate of absorption of a drug from the GI tract into the bloodstream may change as it passes through the GI tract. The rate of absorption for a dissolved drug in a given portion of the GI tract also varies from drug to drug.

After roughly 8-12 hours a typical dosage form will reach the colon. If, hypothetically, a particular drug is simply not absorbed from the colon into the bloodstream, [\*1292] then it may make little sense to develop an extended-release dosage form that is capable of "withholding" the release of some fraction of that drug until it reaches the colon. In other words, under these hypothetical conditions, there may be little motivation to design an oral dosage form capable of releasing drug more *slowly* than over an approximately 8-12 hour time

course, because such drug would be released in the colon, where it is (hypothetically) not absorbed.

The '355 *patent* claims an extended release oxybutynin formulation. Alza argues that one of ordinary [\*\*13] skill in the art would not have believed that oxybutynin could be absorbed in the colon. Absent such absorption, Alza contends that one of ordinary skill in the art lacked the motivation to make the claimed extended release formulation, and that the district court therefore erred in holding that the asserted claims are invalid as obvious over the prior art. For the reasons set forth below, Alza's arguments fail.

#### C. Invalidity

The district court based its invalidity holding both on anticipation and obviousness grounds. Because we affirm its holding based on obviousness, we do not need to address the parties' anticipation arguments.

In finding the asserted claims of the '355 *patent* to be obvious, the district court considered, *inter alia*, the following prior art: U.S. Patent Nos. 5,399,359 ("the Baichwal patent"); 5,082,688 ("the Wong patent"); and 5,330,766 ("the Morella patent").

The Morella patent discloses a "sustained-release pharmaceutical composition including an active ingredient of high solubility in water . . ." According to the specification, highly soluble drugs had posed special challenges for the development of sustained release forms, which the inventors [\*\*14] had set out to solve. "Sustained-release" is defined as release of the active ingredient at a rate that maintains therapeutic, non-toxic blood levels "over an extended period of time e.g. 10 to 24 hours or greater." Highly water soluble drugs were considered to be those having an aqueous solubility of at least roughly 1 part in 30. The commercially available hydrochloride salt of oxybutynin is freely soluble at neutral pH. The patent uses morphine as an example of an active ingredient that can be used in its compositions. Figure 5 demonstrates that one such composition is capable of dispensing morphine at what appears to be an approximately steady rate over the course of 24 hours. Claim 2 of the patent claims "genitourinary smooth muscle relaxants" as one of several types of active ingredients to use in the dosage form identified in claim 1. The specification also identifies oxybutynin as a highly water soluble genitourinary smooth muscle relaxant. Morella also teaches that "the dissolution rate of the

soluble drug at various pH's can be modified at will."

The Baichwal patent teaches a 24 hour extended release oxybutynin formulation. These formulations use an enteric-coated polymer [\*\*15] matrix similar to Mylan's accused product. It also teaches methods of modifying the dosage forms to slow the release rates. During prosecution of the '355 *patent*, the inventor overcame an anticipation rejection by arguing that his invention had a release rate slower than those of the dissolution data presented in Baichwal.<sup>3</sup> The examiner agreed and withdrew his rejection.

3 Tables 15 and 18 of Baichwal, for example, disclose *in vitro* dissolution rates in which roughly half of the drug is dissolved by four hours.

[\*1293] The Wong patent teaches a bilayer osmotic pump dosage form ("the OROS system") used in the preferred embodiment of the '355 *patent*. Wong teaches that this system can be used to deliver any drug over a 24 hour period, and Figure 11 of the patent discloses release rates falling within the claimed release rates of the '355 *patent*. The Wong patent does not specifically teach using oxybutynin with the claimed release technology, but it does teach using several categories of drugs of which oxybutynin is a member, such as anti-cholinergics, analgesics, muscle relaxants and urinary tract drugs.

In analyzing the obviousness issue, the district court first [\*\*16] identified the level of ordinary skill in the art, finding the person of ordinary skill to have either an advanced degree in pharmacy, biology, chemistry or chemical engineering and at least two years of experience with controlled-release technology; or a bachelor's degree in one (or more) of those fields plus five years of experience with such technology. Second, the court examined whether there was a motivation "in the prior art or elsewhere that would have led one of the ordinary skill in the art to combine references," *Alza II*, 388 F. Supp. 2d at 737 (citing *Ruiz*, 234 F.3d 654 at 664 (internal quotations omitted)), and with a "reasonable expectation of success," *id.* (citing *In re O'Farrell*, 853 F.2d 894, 904 (Fed. Cir. 1988)). Third, the district court examined secondary considerations of nonobviousness. After making these factual determinations, it concluded that Mylan had established a strong *prima facie* case of obviousness, which Alza had failed to rebut through secondary considerations. The court concluded that Mylan had demonstrated Alza's patent to be invalid for

obviousness by clear and convincing evidence.<sup>4</sup> We agree. [\*\*17]

4 Having reviewed Alza's sundry contentions that the district court made findings inconsistent with the appropriate burdens of proof for infringement and invalidity, we find them to be without merit.

While we have carefully considered all of the parties' arguments, we discuss principally the dispute over satisfaction of one predicate to a finding of obviousness: that a person of ordinary skill in the art would have had a "motivation to combine" the prior art to achieve the claimed invention and that she would have had a "reasonable expectation of success" in doing so. As an initial matter, we agree with the district court that "on a purely mechanical level, a person of ordinary skill in the art would have a reasonable expectation of success of manufacturing a 24 hour controlled-release oxybutynin formulation . . . once motivated to use oxybutynin." *Id.* at 739. For example, Wong teaches a rate adjustable extended release dosing technology and release rates falling within the claimed parameters. Baichwal and Wong likewise teach ways of achieving slow rates of release, with Baichwal actually teaching extended-release oxybutynin, although arguably not as [\*\*18] slowly as is claimed in the '355 *patent*.<sup>5</sup>

5 The patent examiner initially rejected the '355 *patent* as anticipated by Baichwal, but subsequently allowed its issuance.

Indeed, Alza's principal argument is that no one of ordinary skill in the art would have been motivated to adapt the Morella, Baichwal and Wong technology to oxybutynin *in the first place*, because a person of ordinary skill in the art would have had no reason to expect that such an extended release oxybutynin formulation would have therapeutic value. The issues, as explained above, reduce essentially to whether one of ordinary skill in the art in 1995 would have had a reasonable expectation [\*1294] that oxybutynin would be colonically absorbed and therefore would have been motivated to produce the claimed extended release formulation.

The district court concluded that "the weight of the evidence clearly and convincingly establishes that a person of ordinary skill in the art in 1995 would reasonably expect oxybutynin to absorb in the colon . . .

[and] have a reasonable expectation of success of producing a 24 hour oxybutynin formulation meeting the claims of the '355 patent.<sup>6</sup> *Alza II*, 388 F. Supp. 2d at 740. [\*\*19] Alza argues, however, that the district court erred because "[t]here was no prior art evidence supporting this finding." According to Alza, "[t]here was no contemporaneous documentation supporting the view that any one factor--lipophilicity or anything else--existed to identify successful candidates for once-a-day delivery." It also argues that two prior art references "decisively undercut" the opinion of Mylan's expert, Dr. Amidon, which the district court cited in support of its conclusion. *See Alza II*, 388 F. Supp. 2d at 739-740.

<sup>6</sup> The '355 patent issued on September 26, 2000 and claimed priority as far back as 1995. *See '355 patent*, col. 1, ll. 5-12. The district court treated 1995 as the relevant date for the obviousness inquiry, *see Alza II*, 388 F. Supp. 2d at 740, as do both parties in their obviousness arguments before this court. *See, e.g.*, Alza Reply Br. at 13 (stating that "[t]he dispositive obviousness issue was whether colonic absorption of oxybutynin was reasonably expected in 1995") (emphasis added); Mylan Br. at 6 & n.2 (referring to evidence establishing "the clear expectation of one skilled in the art in 1995" and noting in a footnote that 1995 is "[t]he earliest possible date to which Alza asserts priority.") (emphasis added).

[\*\*20] As an initial matter, it is essential to recognize that, as we have explained above, under our non-rigid "motivation-suggesting-teaching" test, a suggestion to combine need not be found in the prior art. *See Cross Med. Prods.*, 424 F.3d at 1322 ("[T]he motivation to combine need not be found in prior art references, but equally can be found in the knowledge generally available to one of ordinary skill in the art . . ."). Accordingly, where the testimony of an expert witness is relevant to determining the knowledge that a person of ordinary skill in the art would have possessed at a given time, this is one kind of evidence that is pertinent to our evaluation of a *prima facie* case of obviousness. We now turn to consider whether the relevant evidence, including the expert testimony and the prior art, when viewed as a whole supports the findings of the district court. We conclude that the findings of the district court were not clearly erroneous.

Mylan's expert, Dr. Amidon, testified that based on

its lipophilicity, he would "expect oxybutynin to be a highly permeable" compound that is "rapidly absorbed" along the length of the GI tract, including the colon. [\*\*21] Later, when challenged about the predictive value of lipophilicity, Dr. Amidon explained, "I would say there were some unknowns, but again lipophilic drugs would be well absorbed. That would be--that was the general understanding at the time."

Although Alza argues that two prior art references "decisively undercut Dr. Amidon's hindsight opinion," these references are in fact not inconsistent with the general principle that the extent of a drug's colonic absorption correlates with its lipophilicity. Indeed, the first reference, a 1990 publication in the *Journal of Pharmaceutical Sciences*, states that "[i]n general, the more lipophilic drugs were transported rapidly." P. Artursson, *Epithelial Transport of Drugs in Cell Culture. I: A Model for Studying the Passive Diffusion of Drugs over Intestinal Absorptive (Caco-2) Cells*. 79 J. Pharm. Sci. 476, 481 (1990). [\*1295] Alza, however, cites this reference narrowly for its observation that a highly lipophilic analog of a particular drug did not follow the general rule that lipophilic drugs were transported more quickly. *Id.* Granted, the authors admit that "[t]he reason for this [deviation] is currently unknown," and they postulate [\*\*22] that it may be related to a physicochemical factor other than lipophilicity, namely steric hindrance.<sup>7</sup> *Id.* But the mere fact that the colonic absorption rate of a drug may be predicted most precisely by using "many factors," rather than "lipophilicity" alone, does not negate the general predictive utility of lipophilicity in estimating the extent of colonic absorption.

<sup>7</sup> Dr. Chancellor, Alza's expert, likewise characterized colonic absorption as having been understood as being dependent on several physicochemical and physiological variables, of which lipophilicity was one.

The second prior art reference cited by Alza, *Absorption of Polar Drugs Following Caecal Instillation in Healthy Volunteers*, is similarly unavailing to it. Riley, et al., 6 *Aliment. Pharmacol. Ther.* 701, 705 (1992). Again, this reference teaches that while the correlation is not perfect, lipophilicity tended to suggest colonic absorption, stating that "[t]he relationship between the physical characteristics of a drug and its colonic absorption is not yet clear but studies in the rat suggest

that *lipophilic drugs are well absorbed along the length of the gastrointestinal tract* [\*\*23] , whereas hydrophobic polar drugs are absorbed much less from the colon than from the small intestine." *Id.* (emphasis added).

Far from teaching away or detracting from the weight of Dr. Amidon's testimony, these prior art references, taken as a whole, are entirely consistent with the finding that in 1995 a person of ordinary skill in the art would have expected a general, albeit imperfect, correlation between a drug's lipophilicity and its colonic absorptivity. Accordingly, we cannot perceive clear error in the district court's factual findings that while colonic absorption was not *guaranteed*, the evidence, viewed as a whole, is clear and convincing that a person of ordinary skill in the art would nonetheless have perceived a reasonable likelihood of success and that she would have been motivated to combine prior art references to make the claimed invention.

Likewise, we find no error in the district court's consideration of secondary indicia of obviousness. We therefore affirm its legal conclusion of obviousness, finding the district court to have correctly held that Mylan met its burden of overcoming the presumption of validity that attaches to an issued patent.

#### D. [\*\*24] Infringement

The '355 patent specifically describes the rate of oxybutynin release from its "extended release" formulations, requiring that the time-course of *in vivo* oxybutynin release falls within certain boundaries. That is, at certain times, the cumulative amount of dissolved (released) drug must fall within certain ranges. To prove infringement, Alza bore the burden of proving, *inter alia*, that Mylan's accused generic formulation exhibited an *in vivo* release profile falling within the claimed ranges at the relevant times.

At trial, Alza presented no direct evidence of how quickly the accused product dissolved *in vivo*. *Alza II*, at 722. However, it did offer two kinds of indirect evidence as measures of the rate of *in vivo* release. *Id.* First, it presented evidence of the blood plasma concentration versus time profiles for both the accused ANDA formulation and Ditropan, an embodiment [\*1296] of the '355 patent. Second, it presented evidence of the rate of release not in the GI tract but in pieces of laboratory apparatus under certain experimental conditions,

so-called *in vitro dissolution*. The critical deficiency in the evidence presented by Alza was not [\*\*25] that it was "indirect" rather than "direct," but rather that it failed to credibly link these pieces of evidence with the relevant pharmacokinetic parameter--the rate of *in vivo* dissolution in the GI tract.

Thus, the district court explained that Alza had failed to demonstrate how evidence of the rate of dissolution of drug in the GI tract could be extracted from plots of plasma concentration versus time. The district court accepted Alza's simplifying assumption about oxybutynin rapidly being absorbed following dissolution such that the rates of *in vivo* dissolution parallel the rate of drug uptake into the blood. However, it found that only one expert, Dr. Amidon, had "endorsed Alza's subjective comparison of blood plasma levels with *in vivo* release rates." As for that one expert, moreover, he "rejected the very conclusion that Alza attributed to him."

Alza criticizes the district court for "fail[ing] to come to grips with the significance of the testimony" that Dr. Amidon "recanted . . . immediately after he made it." Specifically, Alza urges that notwithstanding the expert's recantation, we should nonetheless draw our independent conclusions from the "point of his [\*\*26] testimony" that release rates in blood and the appearance in the GI tract are essentially the same. We have considered Alza's arguments and find them to lack legal and factual coherency. Even if we were to presume to be experts and to apply the simplifying assumption that the drug is rapidly taken up into the bloodstream upon dissolution, it is not clear to us how to abstract from each plasma concentration versus time curve the rate of uptake into the bloodstream. This would require factoring out of the curve the effects, *inter alia*, of the elimination of drug from the bloodstream over the relevant 24 hour period. But this is not our province. Such evidence, if it exists, must have been presented at trial, or in its stead other evidence sufficient to persuade the trial court.

From what can be discerned, Dr. Amidon's immediately recanted statement appears to have been based on his comparison of the relative areas under the curves of plasma concentration versus time plots of both the accused ANDA formulation and Ditropan XL. Indeed, Alza reproduces in its appellate brief Dr. Amidon's testimony that the accused product has only 92 to 93 percent of the area under the curve of Ditropan [\*\*27] XL. This appears to have resulted in the drawing

464 F.3d 1286, \*1296; 2006 U.S. App. LEXIS 22616, \*\*27;  
80 U.S.P.Q.2D (BNA) 1001

of a line (referred to by the parties as "line A") on a plot of *in vitro* dissolution of both Ditropan XL and the accused ANDA formulation, wherein the rate of *in vitro* dissolution of Mylan's ANDA formulation has been adjusted according to that percentage. The basis for, and significance of, line A is simply not apparent from the record, and Alza fails to provide us with any persuasive line of argument as to how we should imbue line A with any relevant meaning. In short, we agree with Mylan that the plasma concentration versus time data fail to establish *in vivo* release rates for either Ditropan XL or the accused ANDA product.

The district court similarly found unpersuasive Alza's evidence that Ditropan XL and the accused ANDA product sometimes exhibited *in vitro* dissolution rates falling within the claims. The court cited testimony by Dr. Amidon explaining that these *in vitro* procedures are "not designed to reflect the *in vivo* dissolution process." This accords with the common sense notion that one cannot simply proclaim without proof that he has constructed an apparatus capable of mimicking pertinent [\*1297] environmental [\*\*28] variables of the GI tract (along the length of the tract, nonetheless). Indeed, the obtained *in vitro* dissolution rates vary widely with the choice of experimental parameters. We agree with the district court that Alza's evidence of *in vitro* dissolution rates is irrelevant absent evidence demonstrating that the *in vitro* system is a good model of actual *in vivo* behavior. On that point, Alza's evidence is severely lacking.

We therefore affirm the district court's finding of noninfringement. In so doing we explicitly reject Alza's suggestion that the district court erred in failing to specifically state that not only did it find Alza's plasma concentration data and its "*in vitro*" data to be inadequate in isolation, but that it had also found the data to be inadequate in combination. Even if we were to entertain the suggestion that the district court was in fact unfamiliar with the basic precept that it is the totality of the evidence that it must consider in making factual determinations, we would merely conclude that whereas here, if each of two pieces of evidence, assessed separately, is severely inadequate to support a proposition, when their probative values are [\*\*29] tallied, they still fall short. While it is possible to envision cases in which two pieces of evidence may create great probative value synergistically, this is not one of those cases.

\* \* \*

In conclusion, we affirm the judgment of the district court that the asserted claims of the '355 patent were invalid, and that notwithstanding, the patent was not infringed.

*AFFIRMED.*

Costs to Mylan.

LEXSEE 396 U.S. 57

**ANDERSON'S-BLACK ROCK, INC. v. PAVEMENT SALVAGE CO., INC.**

No. 45

**SUPREME COURT OF THE UNITED STATES**

**396 U.S. 57; 90 S. Ct. 305; 24 L. Ed. 2d 258; 1969 U.S. LEXIS 3322; 163 U.S.P.Q.  
(BNA) 673**

**November 10, 1969, Argued  
December 8, 1969, Decided**

**PRIOR HISTORY:** CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE FOURTH CIRCUIT.

**DISPOSITION:** *404 F.2d 450*, reversed.

**SUMMARY:**

The plaintiff had a patent for combining on one paving machine chassis (1) a radiant burner for heating the exposed edge of a cold strip of pavement, and (2) equipment for spreading and shaping asphalt. The purpose of heating the exposed edge was to make it pliable and thereby to improve the bonding between strips of pavement. Rejecting the plaintiff's claim that the defendant had infringed the plaintiff's patent, a Federal District Court found the patent invalid. The Court of Appeals for the Fourth Circuit reversed. (*404 F.2d 450*.)

On certiorari, the United States Supreme Court reversed. In an opinion by Douglas, J., expressing the unanimous view of the court, it was held that the combination which was the subject matter of the plaintiff's patent was reasonably obvious to one with ordinary skill in the art and was thus not a patentable invention.

Burger, Ch. J., did not participate.

**LAWYERS' EDITION HEADNOTES:**

[\*\*\*LEdHN1]

PATENTS §64

prior knowledge -- combination --

Headnote:[1]

The combination on one paving machine chassis of equipment for spreading and shaping asphalt, having been known in the prior art, is not a patentable invention.

[\*\*\*LEdHN2]

PATENTS §57

prior knowledge -- radiant burner --

Headnote:[2]

The use of a radiant-heat burner in working asphalt pavement, having been known in the prior art and disclosed in a previous patent, is not, by itself, patentable.

[\*\*\*LEdHN3]

PATENTS §40

combination -- obviousness --

Headnote:[3A][3B]

Even if the combination on one paving machine chassis of (1) a radiant burner for heating the exposed edge of a cold strip of pavement, and (2) equipment for spreading and shaping asphalt, has filled a long-felt want, has performed a useful function, and has enjoyed commercial success, such a combination is reasonably obvious to one with ordinary skill in the art and is thus not a patentable invention, where (1) the presence of the radiant burner in the same machine as the other equipment is not critical or essential to the burner's function in curing the problem of a cold joint between

396 U.S. 57, \*; 90 S. Ct. 305, \*\*;  
24 L. Ed. 2d 258, \*\*\*LEDHN3; 1969 U.S. LEXIS 3322

strips of pavement and hence adds nothing to the nature and quality of a radiant burner already patented; and (2) the combination does not result in an effect greater than the sum of the several effects taken separately.

[\*\*\*LEDHN4]

#### PATENTS §2

power of Congress --

Headnote:[4]

The patent standard is basically constitutional, Article I, 8, of the Constitution authorizing Congress to promote the progress of useful arts by allowing inventors monopolies for limited times; under this power, Congress may not enlarge the patent monopoly without regard to the innovation, advancement, or social benefit gained thereby, nor may Congress authorize the issuance of patents whose effects are to remove existent knowledge from the public domain or to restrict free access to materials already available.

[\*\*\*LEDHN5]

#### PATENTS §1

inherent requisites --

Headnote:[5]

Innovation, advancement, and things which add to the sum of useful knowledge are inherent requisites in a patent system which by constitutional command must promote the progress of useful arts, and this standard, expressed in the Constitution, may not be ignored.

[\*\*\*LEDHN6]

#### PATENTS §19.1

obviousness --

Headnote:[6]

In resolving the issue of obviousness for purposes of deciding whether a patent may be obtained, the scope and content of the prior art are to be determined, differences between the prior art and the claims at issue are to be ascertained, and the level of ordinary skill in the pertinent art is to be resolved; and strict observance of these requirements is necessary.

#### SYLLABUS

Respondent brought this action for infringement of a patent for "Means for Treating Bituminous Pavement." The patent sought to solve the problem of a cold joint on "blacktop" paving by combining known elements, a radiant-heat burner, a spreader, and a tamper and screed, on one chassis. The District Court, finding that all the inventor had done was to construct known elements in the prior art on a single chassis, held the patent invalid. The Court of Appeals reversed. *Held:* While the combination of old elements performed a useful and commercially successful function it added nothing to the nature and quality of the previously patented radiant burner, and to those skilled in the art the use of the old elements in combination was not an invention under the standard of 35 U. S. C. § 103. Pp. 59-63.

**COUNSEL:** Alan W. Borst argued the cause for petitioner. With him on the brief was Nathaniel L. Leek.

Walter J. Blenko, Jr., argued the cause and filed a brief for respondent.

**JUDGES:** Black, Douglas, Harlan, Brennan, Stewart, White, Marshall; Burger took no part in the decision of this case.

#### OPINION BY: DOUGLAS

#### OPINION

[\*57] [\*\*\*260] [\*\*306] MR. JUSTICE DOUGLAS delivered the opinion of the Court.

Respondent brought this action against petitioner for infringement of *United States Patent No. 3,055,280* covering "Means for Treating Bituminous Pavement." The patent was assigned to respondent by one Neville.

Bituminous concrete -- commonly called asphalt or "blacktop" -- is often laid in strips. The first strip laid usually has cooled by the time the adjoining strip is to be laid, creating what is known as a cold joint. [\*58] Because bituminous concrete is pliable and capable of being shaped only at temperatures of 250 degrees to 290 degrees F., the cold joint results in a poor bonding between the strips. Water and dirt enter between the strips, causing deterioration of the pavement.

Respondent's patent sought to solve the problem of

396 U.S. 57, \*58; 90 S. Ct. 305, \*\*306;  
24 L. Ed. 2d 258, \*\*\*260; 1969 U.S. LEXIS 3322

the cold joint by combining on one chassis (1) a radiant-heat burner for heating the exposed edge of the cold strip of pavement; (2) a spreader for placing bituminous material against that strip; and (3) a tamper and screed, for shaping the newly placed material to the desired contour and surface.

[\*\*\*LEdHR1] [1]The standard paving machine in use prior to respondent's claimed invention combined on one chassis the equipment for spreading and shaping the asphalt, and it is unquestioned that this combination alone does not result in a patentable invention. Petitioner's alleged infringement resulted from its placing of a radiant-heat burner on the front of a standard paving machine, thus allowing its machine to perform the same functions with the same basic elements as those described in respondent's patent.

[\*\*\*LEdHR2] [2]The use of a radiant-heat burner in working asphalt pavement dates back to a patent issued in 1905 to one Morcom, *United States Patent No. 799,014*. The value of such a heater lies in the fact that it softens the asphalt without burning the surface. The radiant-heat burner on respondent's claimed invention is essentially the same as that disclosed in a patent issued in 1956 to one Schwank, *United States Patent No. 2,775,294*. Thus the burner, by itself, is also not patentable.

The placement of the radiant-heat burner upon the side of a standard bituminous paver is the central feature of respondent's patent. The heater is used [\*\*307] in this way for continuous paving along a strip to prevent a cold joint, whereas previously radiant-heat burners had [\*59] been used merely for patching limited areas of asphalt. The operation of the heater is, however, in no way dependent on the operation of the other equipment on the paving machine. It is hung on the paver merely because that is a convenient place for it when heating the longitudinal joint of the pavement. A separate heater can also be used in conjunction with a standard paving machine to eliminate the cold joint, and in fact is so used for heating the transverse joints of the pavement.

Respondent claims that its patent involves a combination of prior art which produces the new and useful result of eliminating the cold joint. Its claim of unobviousness is based [\*\*\*261] largely on the testimony of two individuals who are knowledgeable in the field of asphalt paving, expressing their doubts to the inventor Neville that radiant heat would solve the

problem of cold joints. The District Court rejected respondent's claim of infringement, finding the patent invalid. The Court of Appeals, by a divided vote, reversed. For reasons that follow, we reverse the judgment of the Court of Appeals.

Each of the elements combined in the patent was known in the prior art. It is urged that the distinctive feature of the patent was the element of a radiant-heat burner. But it seems to be conceded that the burner, by itself, was not patentable. And so we reach the question whether the combination of the old elements created a valid combination patent.

[\*\*\*LEdHR3A] [3A]The District Court said: "All that plaintiff [respondent] has done is to construct four elements known in the prior art on one chassis." That is relevant to commercial success, not to invention. The experts tendered by respondent testified that they had been doubtful that radiant heat would solve the problem of [\*60] the cold joint.<sup>1</sup> But radiant heat was old in the art. The question of invention must turn on whether the combination supplied the key requirement. We conclude that the combination was reasonably obvious to one with ordinary skill in the art.

<sup>1</sup> Mr. Francis C. Witkoski, an engineer, met the inventor, Charles Neville, between 1955 and 1960 while Witkoski was Director of Research for the Pennsylvania Department of Highways. Neville told Witkoski that he had invented a piece of equipment that would heat but not burn asphalt, and would thus eliminate cold joints. Witkoski replied that he did not believe that Neville had such a piece of equipment. Subsequently, Witkoski ordered from Neville some of the separate burner units and tested them. Thus the dialogue between Witkoski and Neville focused exclusively on the properties of the radiant-heat burner.

Mr. Leslie B. Crowley, also an engineer, met Neville prior to 1954. Crowley was at that time the Chief of the Pavements and Railroads Section, Director of Installations, Headquarters, United States Air Force. Neville explained the advantages of using an "infra-red" heater for the maintenance and repair of asphalt pavements. Crowley testified that his interest was insufficient at that time to motivate him to take any action with regard to the device because he did not

396 U.S. 57, \*60; 90 S. Ct. 305, \*\*307;  
24 L. Ed. 2d 258, \*\*\*LEdHR3A; 1969 U.S. LEXIS 3322

believe it would "do the job." Thus the Crowley-Neville discussion also focused entirely on the radiant-heat burner, and not on the combination of the burner with the other elements of a bituminous paver.

There is uncontested evidence that the presence of the radiant-heat burner in the same machine with the other elements is not critical or essential to the functioning of the radiant-heat burner in curing the problem of the cold joint. For it appears that a radiant-heat burner operating in a tandem fashion would work as well. The combination of putting the burner together with the other elements in one machine, though perhaps a matter of great convenience, did not produce a "new or different function," *Lincoln Co. v. Stewart-Warner Corp.*, 303 U.S. 545, 549, [\*\*308] within the test of validity of combination patents.

[\*61] A combination of elements may result in an effect greater than the sum of the several effects taken separately. No such synergistic result is argued here. It is, however, fervently argued that the combination filled a long felt want and has enjoyed commercial success. [\*\*\*262] But those matters "without invention will not make patentability." *A. & P. Tea Co. v. Supermarket Corp.*, 340 U.S. 147, 153.

[\*\*\*LEdHR4] [4] [\*\*\*LEdHR5] [5] The patent standard is basically constitutional, Article I, § 8, of the Constitution authorizing Congress "to promote the Progress of . . . useful Arts" by allowing inventors monopolies for limited times. We stated in *Graham v. John Deere Co.*, 383 U.S. 1, 6, that under that power Congress may not "enlarge the patent monopoly without regard to the innovation, advancement or social benefit gained thereby. Moreover, Congress may not authorize the issuance of patents whose effects are to remove existent knowledge from the public domain, or to restrict free access to materials already available. Innovation, advancement, and things which add to the sum of useful knowledge are inherent requisites in a patent system which by constitutional command must 'promote the Progress of . . . useful Arts.' This is the *standard* expressed in the Constitution and it may not be ignored."

In this case the question of patentability of the combination turns on the meaning of 35 U. S. C. § 103<sup>2</sup> which [\*62] the Court reviewed in the *Graham* case, *supra*, at 13-17. We said:

"We believe that this legislative history, as well as other sources, shows that the revision was not intended by Congress to change the general level of patentable invention. We conclude that the section was intended merely as a codification of judicial precedents embracing the *Hotchkiss*<sup>3</sup> condition, with congressional directions that inquiries into the obviousness of the subject matter sought to be patented are a prerequisite to patentability." *Id.*, at 17.

2 35 U. S. C. § 103 provides:

"A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made."

3 *Hotchkiss v. Greenwood*, 11 How. 248.

[\*\*\*LEdHR6] [6] Obviousness, as an issue, is resolved as follows:

"Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved." *Ibid.*

We admonished that "strict observance" of those requirements is necessary. *Id.*, at 18.

[\*\*\*LEdHR3B] [3B] We conclude that while the combination of old elements performed a useful function, <sup>4</sup> it added nothing to the nature and quality of the radiant-heat [\*\*309] burner already patented. We conclude further that [\*\*\*263] to those skilled in the art the use of the old elements in combination [\*63] was not an invention by the obvious-nonobvious standard. Use of the radiant-heat burner in this important field marked a successful venture. But as noted, more than that is needed for invention.

4 35 U. S. C. § 101 provides:

"Whoever invents or discovers any new and useful process, machine, manufacture, or

396 U.S. 57, \*63; 90 S. Ct. 305, \*\*309;  
24 L. Ed. 2d 258, \*\*\*263; 1969 U.S. LEXIS 3322

composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title."

Absent here is the element "new." For as we have said, the combination patent added nothing to the inherent characteristics or function of the radiant-heat burner.

*Reversed.*

THE CHIEF JUSTICE took no part in the decision of this case.

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LEXSEE 770 F.2D 1031

**CABLE ELECTRIC PRODUCTS, INC., Appellant v. GENMARK, INC., a/k/a  
DIABLO PRODUCTS CORP., Appellee**

**No. 84-1412**

**UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT**

*770 F.2d 1015; 1985 U.S. App. LEXIS 15064; 226 U.S.P.Q. (BNA) 881*

**August 9, 1985**

**PRIOR HISTORY:** [\*\*1]

Appealed from: U.S. District Court for the District of California.

**COUNSEL:**

Paul J. Sutton, of New York, New York, argued for Appellant. With him on the brief was Barry G. Magidoff and Anthony Amaral, Jr.

Alan H. MacPherson, Skjerven, Morrill, MacPherson, Franklin & Friel, of San Francisco, California, argued for Appellee. With him on the brief were Thomas J. Friel, Jr. and Doniel E. Weil.

**JUDGES:**

Bennett, Circuit Judge, Miller, Senior Circuit Judge, \* and Smith, Circuit Judge.

\* The Honorable Jack R. Miller assumed senior status effective June 6, 1985.

**OPINION BY:**

BENNETT

**OPINION:**

[\*1018] BENNETT, Circuit Judge.

**I. BACKGROUND**

This is an appeal from the United States District

Court for the Northern District of California n1 which through its grants of summary judgment favorable to defendant Genmark, Inc. (Genmark), on February 29, 1984, n2 and May 25, 1984, n3 rendered a final judgment in Civil Docket No. C-83-0897-WWS, an action for patent infringement, federal false designation of origin, state unfair competition, and state trademark infringement.

n1 The Honorable William W. Schwarzer, District Judge.

[\*\*2]

n2 582 F. Supp. 93, 223 U.S.P.Q. (BNA) 287.

n3 586 F. Supp. 1505, 223 U.S.P.Q. (BNA) 291.

The original complaint in this action was filed February 25, 1983, and accused Genmark of infringement of United States Patent No. 4,343,032 issued to Frederic W. Schwartz (the Schwartz patent) and owned by plaintiff Cable Electric Products, Inc. (Cable). The Schwartz patent relates to a photosensitive electric lamp able to turn itself on by degree as ambient light diminishes. As illustrated in Fig. 1 from the Schwartz patent, appearing below with unnecessary reference characters omitted, such a lamp includes a housing 10 which supports a light bulb 18 enclosed by a removable translucent shade 24. A lens 12 on the front of housing 10 permits ambient light to reach electrical circuitry and effect the operation described above. The device obtains

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power from a conventional electric wall receptacle through a pair of contact blades 14 at the rear of housing 10.

[SEE ILLUSTRATION IN ORIGINAL]

On October 11, 1983, Genmark filed a first motion for summary judgment. [\*\*3] The following day Cable moved for leave to amend its complaint to include, in addition to the patent count already joined, three others not based on any patent. The requested [\*1019] leave to amend was granted November 17, 1983. Subsequently, Genmark's first motion for summary judgment as to the patent count was granted. Thereafter, on April 24, 1984, Genmark made a second motion for summary judgment, this time as to the three counts added to the litigation by the amended complaint. The second motion was also granted, and the present appeal resulted.

We affirm the grant of summary judgment as to the patent infringement count, vacate the grant of summary judgment as to the nonpatent counts, and remand these for further appropriate deliberations.

The judgments will be reviewed below in the order granted. n4

n4 The discussion to follow can be summarized in outline form, which for the convenience of the reader is provided below:

## I. BACKGROUND

## II. THE PATENT COUNT

### A. Summary Judgment

### B. Harmful Error

### C. Burdens of Proof

### D. Prior Art

### E. Hodgetts Declaration

### F. Secondary Factors

1. Commercial Success
2. Product Copying

### G. Disposition

## III. THE NONPATENT COUNTS

### A. Lanham Act

### B. State Causes of Action

1. Choice of Law
2. Preemption
3. Disposition

## IV. CONCLUSION

## APPENDIX

[\*\*4]

## II. THE PATENT COUNT

The district court dealt with the Genmark motion for summary judgment on the patent infringement count of the original complaint of Cable Electric in a Memorandum of Opinion and Order dated February 29, 1984 (the patent opinion). n5 There it stated, "The Court finds that, although defendant cannot establish that its device does not infringe plaintiff's patent, defendant does meet its burden of proof in establishing the obviousness of plaintiff's claimed invention under 35 U.S.C. § 103 without raising a genuine dispute of material fact." The Genmark motion was accordingly granted, and the Schwartz patent invalidated.

n5 See *supra* note 2.

Cable Electric attacks that judgment scattershot fashion with a laundry list of objections which fall into the two general areas of inquiry suggested by *Fed. R. Civ. P. 56(c)*, n6 namely, (1) the existence of genuine issues of material fact and (2) the entitlement of the movant to judgment as a matter of law. In the former [\*\*5] category, it is asserted that the obviousness standard used by the district court evidences a level of uncertainty which implies the existence of genuine issues of material fact, and that affidavits or deposition testimony submitted in opposition to the summary judgment motion raise contested issues of material fact with regard to the scope and content of the prior art, the differences between that art and the claims at issue, the commercial success of the product embodying those claims, and the copying of that product by Genmark as demonstrating nonobviousness. It

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is asserted that the evidence on these issues was not viewed in a light most favorable to Cable, the opponent of summary judgment.

<sup>n6</sup> *Fed. R. Civ. P. 56(c)* states in relevant part:

"The judgment sought shall be rendered forthwith if the pleadings, depositions, answers to interrogatories, and admissions on file, together with the affidavits, if any, show that there is no genuine issue as to any material fact and that the moving party is entitled to a judgment as a matter of law."

[\*\*6]

Regarding the law employed, Cable contends that the district court erred in that it shifted the burden of persuasion on invalidity, failed to determine that the art relied on to invalidate the Schwartz patent was more pertinent than that considered during prosecution, did not specifically indicate the combination of teachings that would yield the claimed invention, gave inadequate consideration to commercial success and copying as secondary indicia of nonobviousness, and applied an incorrect obviousness standard, which included, among other alleged [\*1020] deficiencies, a failure to consider the claimed invention as a whole.

We find these assertions individually and collectively to be without merit. The patent opinion of the district court is well reasoned and, in light of the record upon which it is based, adequate, accurate, and amply justified. The following discussion substantiates our conclusion.

#### A. Summary Judgment

Some comments on the use and appellate review of summary judgment are required to provide a frame of reference for a discussion of the record.

A number of objections by Cable are essentially complaints that the district court did not adequately [\*\*7] amplify its reasoning and the underlying factual inferences on which it relied in granting summary judgment. *Fed. R. Civ. P. 56 (c)*, however, makes it clear that the circumstances in which a grant of summary judgment is proper are circumstances in which a district

court need not function as an arbiter among differing versions of every factual reality for which evidentiary support has been presented. Instead, the circumstances appropriate to summary judgment are those in which a district court is able to conclude that, with regard to any factual issues material to granting judgment as a matter of law, no genuine dispute exists. Thus, it manifests incorrect expectations to fault a district court in granting summary judgment for a failure to find particular facts. To engage in fact finding would be not only inappropriate, but would per se imply the impropriety of the grant. *See Lemelson v. TRW, Inc.*, 760 F.2d 1254, 1260-61, 225 U.S.P.Q. (BNA) 697, 700-01 (*Fed. Cir.* 1985).

Additionally, [\*\*8] although *Fed. R. Civ. P. 52(a)* provides that a "court shall find the facts specially and state separately its conclusions of law thereon," the rule contains the pertinent qualification that "findings of fact and conclusions of law are unnecessary on decisions of motions under Rules 12 or 56." *Accord Helena Rubinstein, Inc. v. Bau*, 433 F.2d 1021, 1024, 167 U.S.P.Q. (BNA) 711, 713 (*9th Cir.* 1970); *Fromberg, Inc. v. Gross Manufacturing Co.*, 328 F.2d 803, 806, 140 U.S.P.Q. (BNA) 641, 643 (*9th Cir.* 1964). An exception, which we do not consider to be applicable here, can be found in *Fed. R. Civ. P. 56* in the case of grants of partial summary judgment. <sup>n7</sup> Assuredly, to know the reasoning a district court used in deciding to grant summary judgment facilitates the task of a reviewing court, and there does exist a risk in complicated cases of an unnecessary reversal if the logic that resulted in a grant of summary judgment cannot be discerned. *See Petersen Manufacturing Co. v. Central Purchasing, Inc.*, 740 F.2d 1541, 1546, 222 U.S.P.Q. (BNA) 562, 566 (*Fed. Cir.* 1984). Nevertheless, in light of the record before us and the patent opinion of [\*\*9] the district court, the issues in this case present no such degree of complexity as would preclude affirmance, due to any failure of the district court to make the basis of its holding clear.

<sup>n7</sup> *Fed. R. Civ. P. 56(d)* states:

"Case Not Fully Adjudicated on Motion. If on motion under this rule judgment is not rendered upon the whole case or for all the relief asked and a trial is necessary, the court at the hearing of the motion, by examining the pleadings and the evidence before it and by interrogating counsel, shall if practicable ascertain what material facts

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exist without substantial controversy and what material facts are actually and in good faith controverted. It shall thereupon make an order specifying the facts that appear without substantial controversy, including the extent to which the amount of damages or other relief is not in controversy, and directing such further proceedings in the action as are just. Upon the trial of the action the facts so specified shall be deemed established, and the trial shall be conducted accordingly."

While the patent decision of the district court did not immediately dispose of "the whole case" brought by Cable, within 3 months a second order of summary judgment had decided the balance of the case. Consequently, no trial has proved necessary. As both summary judgment orders are before us in this appeal, and as the parties have not premised any arguments upon the fact that the initial, patent opinion was "not rendered upon the whole case," we view the exception of *Fed. R. Civ. P. 56(d)* as not applicable in any way here to increase the duty of the district court to find facts specially.

[\*\*10]

Thus, the complaint of Cable as to the insufficiency of "the factual findings of the [\*1021] District Court on the scope and content of the prior art [or] . . . the differences between the prior art and the claims at issue" is unpersuasive for at least three reasons. First, the presence of findings would signal the possible existence of disputed issues of material fact, none of which we discern to exist. Second, there is no legal requirement that the rationale behind a nonpartial grant of summary judgment, including a recitation of undisputed factual inferences and applications of legal principles, be made explicit. The only requirement in this regard is pragmatic, with an eye toward judicial economy and communication with the litigants. Finally, in this instance, the premise underlying the argument is simply incorrect. Contrary to the hyperbole of Cable, the patent opinion of the district court evidences that it considered and, in view of the straightforward nature of this case, adequately discussed the issues involved.

On this basis, we also dispose of the charge by Cable  
[\*\*11] that the district court "failed to make a factual

determination as to whether any of these [prior art patent] references were or were not more pertinent than the art considered by the Patent and Trademark Office during the prosecution of the patent-in-suit." Cable cites *Jones v. Hardy*, 727 F.2d 1524, 1529, 220 U.S.P.Q. (BNA) 1021, 1025 (Fed. Cir. 1984), as condemning the omission of such a determination. Nevertheless, in *Jones* the appeal was from a judgment rendered after a 2-day trial, rather than one from summary judgment, and the failure of the lower court opinion to contain a *factual* determination as to pertinency was but one of many, more major flaws in the obviousness analysis cited by this court in reversing a conclusion of invalidity. The analysis faulted in *Jones* included, for example, a denial of the "statutory presumption of validity and an impermissible burden-shifting," *id.*, which, as will be discussed below, did not occur here. Cf. *King Instrument Corp. v. Otari Corp.*, 767 F.2d 853, , 226 U.S.P.Q. (BNA) 402, 404 (Fed. Cir. 1985) (referring to the failings in the *Jones* analysis as a "parade of horrors"). [\*\*12] A determination on pertinency may in some cases afford insight into the reasoning of the factfinder, but it is not strictly a requirement under *Graham v. John Deere Co.*, 383 U.S. 1, 148 U.S.P.Q. (BNA) 459, 15 L. Ed. 2d 545, 86 S. Ct. 684 (1966), for a proper obviousness analysis.

Review of the grant of summary judgment at issue then first requires review of the evidence relevant to the factual inquiries of *Graham*, including evidence relevant to the secondary considerations, in order to determine whether any genuine issue exists as to facts material to reaching a conclusion on obviousness. *Cooper v. Ford Motor Co.*, 748 F.2d 677, 679, 223 U.S.P.Q. (BNA) 1286, 1287-88 (Fed. Cir. 1984). If not, and if viewing that evidence in a light most favorable to the nonmovant and drawing in favor thereof all inferences as are reasonable, the moving party is entitled to judgment as a matter of law, the grant of summary judgment will be affirmed. *Id.* at 679, 223 U.S.P.Q. at 1288. [\*\*13]

#### B. Harmful Error

In such analysis as Cable is willing to acknowledge was included by the district court in its patent opinion, several errors are alleged. Nevertheless, as obviousness under 35 U.S.C. § 103 (1982) is a conclusion of law subject to our full and independent review, *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 1344, 220 U.S.P.Q. (BNA) 777, 782 (Fed. Cir.) (in banc), cert. denied, 469 U.S. 830, 105 S. Ct. 116, 225 U.S.P.Q. (BNA) 232, 83 L.

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*Ed. 2d 60 (1984)*, reversal in this instance would require more than a mere demonstration of error in analysis. Even assuming that such errors were committed, Cable must demonstrate that if the errors were corrected, the application of the law to the facts present would produce a different result. *Union Carbide Corp. v. American Can Co.*, 724 F.2d 1567, 1573, 220 U.S.P.Q. (BNA) 584, 589 (Fed. Cir. 1984). In short, such errors as may be demonstrated must have further been harmful. See 28 U.S.C. [\*1022] § 2111. n8 Accord [\*\*14] *Richdel, Inc. v. Sunspool Corp.*, 714 F.2d 1573, 1580, 219 U.S.P.Q. (BNA) 8, 12 (Fed. Cir. 1983).

n8 28 U.S.C. § 2111 (1982) reads as follows:

"*Harmless error*. On the hearing of any appeal or writ of certiorari in any case, the court shall give judgment after an examination of the record without regard to errors or defects which do not affect the substantial rights of the parties."

### C. Burdens of Proof

The burdens of demonstrating the absence of genuine issues of material fact and the entitlement to judgment as a matter of law is upon the summary judgment movant, Genmark. *Cooper*, 748 F.2d at 679, 223 U.S.P.Q. at 1288. In this instance, as Genmark is also the party asserting the invalidity of a United States patent, the burden of demonstrating an entitlement [\*\*15] to judgment as a matter of law includes the burden of overcoming the presumption of patent validity found in 35 U.S.C. § 282. n9 Cable claims that, despite explicit mention by the district court, the presumption of validity was not observed. The presumption of section 282 is "a procedural device which places on a party asserting invalidity the initial burden of going forward to establish a *prima facie* case on that issue." *Lear Siegler, Inc. v. Aeroquip Corp.*, 733 F.2d 881, 885, 221 U.S.P.Q. (BNA) 1025, 1028 (Fed. Cir. 1984). While "the burden of persuasion on the issue of invalidity also rests throughout the litigation with the party asserting invalidity," *id.*, if evidence is presented establishing a *prima facie* case of invalidity, the opponent of invalidity must come forward with evidence to counter the *prima facie* challenge to the presumption of section 282. This requirement is in no way contrary to the procedural role of the presumption of validity. Nor does it in substance shift the burden of persuasion on the issue. "In the end, the [\*\*16] question

is whether all the evidence establishes that the validity challenger so carried his burden as to have persuaded the decisionmaker that the patent can no longer be accepted as valid." *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1534, 218 U.S.P.Q. 871, 876 (Fed. Cir. 1983).

n9 35 U.S.C. § 282 (1982) contains the following first paragraph:

"*Presumption of validity; defenses*

"A patent shall be presumed valid. Each claim of a patent (whether in independent, dependent, or multiple dependent form) shall be presumed valid independently of the validity of other claims; dependent or multiple dependent claims shall be presumed valid even though dependent upon an invalid claim. The burden of establishing invalidity of a patent or any claim thereof shall rest on the party asserting such invalidity."

Likewise, [\*\*17] on a motion for summary judgment, the burden is upon the movant in support thereof to demonstrate an absence of genuine issues of material fact and then the entitlement to judgment at law. *Fed. R. Civ. P. 56(c)*. n10 If a showing is made that would entitle the movant to judgment unless contradicted, then *Fed. R. Civ. P. 56(e)* n11 states that the nonmovant has the burden to show that such a contradiction is possible; it cannot rest upon its allegations and pleadings. *First National Bank v. First Bank Stock Co.*, 306 F.2d 937, 943 (9th Cir. 1962). Indeed, this "shift of burden and the duty to come forward with possible contradiction of proof is the essence of *Fed. R. Civ. P. 56*." *DeLong Corp. v. Raymond International, Inc.*, 622 F.2d 1135, 1144, 206 U.S.P.Q. (BNA) 97, 104 (3d Cir. 1980) (cited and quoted in part in *D. L. Auld Co. v. Chroma Graphics Corp.*, 714 F.2d 1144, 1150, 219 U.S.P.Q. (BNA) 13, 17-18 (Fed. Cir. 1983)). Here, once Genmark had established its *prima facie* case for summary judgment, which would have included a *prima facie* case for overcoming the presumption of validity, it fell upon Cable to submit evidence setting [\*\*18] forth specific facts raising [\*1023] a genuine issue for trial. *First National Bank v. Cities Service Co.*, 391 U.S. 253, 289, 20 L. Ed. 2d 569, 88 S. Ct. 1575, *reh'g denied*, 393 U.S. 901, 89 S. Ct. 63, 21 L. Ed. 2d 188 (1968). This Cable clearly understood

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when it submitted, in opposition to the summary judgment motion of Genmark, deposition testimony and various declarations which it contended raised genuine issues of material fact relative to an obviousness analysis under *Graham*. In commenting on the effectiveness of one of these declarations in presenting evidence of factual issues requiring trial, the district court said "plaintiff [Cable] seeks to avoid summary judgment by introducing the declaration of an expert that, it claims, raises genuine issues of material fact." 582 F. Supp. at 97, 223 U.S.P.Q. at 291. It is now contended that the "avoid summary judgment" phrase of this statement demonstrates that the district court improperly shifted to Cable, the patentee, the burden of persuasion on the issue of invalidity. We disagree.

n10 See *supra* note 6.

[\*\*19]

n11 *Fed. R. Civ. P. 56(e)* states in relevant part:

"When a motion for summary judgment is made and supported as provided in this rule, an adverse party may not rest upon the mere allegations or denials of his pleading, but his response, by affidavits or as otherwise provided in this rule, must set forth specific facts showing that there is a genuine issue for trial. If he does not so respond, summary judgment, if appropriate, shall be entered against him."

For reasons to be discussed below, and with which we concur, the district court deemed the affidavits submitted by Cable to have been inadequate to show any genuinely contested issues of material fact. Thus, Cable failed in the duty imposed upon it by *Fed. R. Civ. P. 56(e)* to rebut the *prima facie* case for summary judgment by showing "that there is a genuine [factual] issue for trial." Contrary to the argument of Cable, this duty is distinct from that of "requiring that the evidence 'persuade' the court of patentability," which was condemned [\*\*20] in *Jones v. Hardy*, 727 F.2d at 1528, 220 U.S.P.Q. at 1025. The avoidance of summary judgment as to patent invalidity does not represent a shift of the burden of going forward to establish a case for invalidity or the burden of persuasion on the issue of

invalidity. Under section 282 these burdens were imposed on Genmark, and we have not been given the impression that the district court shifted them to Cable. The stray and inconsequential quotations proffered in this regard from the summary judgment hearing add nothing to the meritless claim that the presumption of validity was not observed.

#### D. Prior Art

The district court opinion invalidating the Schwartz patent mentions a number of prior art patent references. Among these, U.S. Patent No. 3,968,355 to Smallegan (the Smallegan patent) discloses a night light controlled by a photosensitive switch and operated from an electric wall receptacle. It is undisputed that this reference alone teaches all of the limitations in the claims of the Schwartz patent, save those pertaining to what is termed in claim 1 thereof n12 "a shade of predetermined shape and appearance." In this regard, however, the Smallegan patent [\*\*21] does contain a specific suggestion for providing some sort of shade about the bulb of the device to reduce the effect of the bulb on the photosensitive control, and other references discussed below exhibit the shade details recited in the patent in suit.

n12 Claim 1, the sole independent claim of the three claims in the Schwartz patent, is included by way of illustration in the Appendix to this opinion.

For example, U.S. Patent No. 3,694,607 to Fontana and U.S. Patent No. Des. 205,371 to Mellyn, from which Fig. 3 is included here, disclose bottom-mounted night light shades which "frictionally engage and disengage in a snap-on manner . . . said [lamp] housing in a position . . . facilitating repeated replacement of said bulb," as is recited in claim 1 of the Schwartz patent.

#### [SEE ILLUSTRATION IN ORIGINAL]

Additionally, U.S. Patents Nos. Des. 207,500 and Des. 208,939, both also to Mellyn, show such shades having "front and side [\*1024] wall portions." Figs. 1 and 2 of the latter patent [\*\*22] are included below and depict a shade fully described by the following limitation from claim 1 of the patent in suit:

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Said front wall portion [has] a generally planar surface extending between generally rectangular edges including longer vertically extending edges and relatively shorter horizontally extending edges, said side wall portions extending in a diverging manner generally symmetrically at a predetermined angle greater than 90 degrees away from said front wall portion toward a rearward plane of said [lamp] housing. . . ."

All of these references are from the electric night light art, the same as that of the patent in suit and of the Smallegan patent. Based on the explicit suggestions for a shade contained in the latter, teachings of these references could have been combined to produce a device meeting all the limitations of claim 1 of Schwartz except for having "a generally polygonal-shaped pattern extending over substantially the entire front wall portion" of the shade.

This feature, however, can be found in the following patents among those mentioned by the district court as examples of such a teaching:

[SEE ILLUSTRATION IN ORIGINAL]

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U.S. Patent No.	Patentee
Des. 127,892 Ohm	
3,549,879 Meyer	
3,265,887 Wince	
2,978,575 Cohen	

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[\*\*23]

None of these deal with shades for night lights specifically, but rather with shades for overhead lighting fixtures. Cable argues that these would use fluorescent light bulbs in contrast to the incandescent-type employed with the night light of the Schwartz patent. The declaration of 33-year Cable employee, Harry Hodgetts, head of the company's design engineering department (the Hodgetts declaration), attempts to puff up the difference between the two types of light bulbs as presenting "entirely different light diffusing problems," but fails absolutely to elaborate the nature of the purported differences. Such unsupported conclusional statements are not helpful in affidavits used to "avoid summary judgment."

The references demonstrate that polygonal patterning on light shades was old in the lighting art, even if not in the narrow field of night lights. Each reference addresses a problem confronted by the Schwartz patent, namely, the diffusion of light from an electric bulb, be it incandescent or fluorescent, through a translucent [\*1025] shade. In evaluating obviousness, the [\*\*24] hypothetical person

of ordinary skill in the pertinent art is presumed to have the "ability to select and utilize knowledge from other arts reasonably pertinent to [the] particular problem" to which the claimed invention is directed. *In re Antle*, 58 C.C.P.A. 1382, 444 F.2d 1168, 1171-72, 170 U.S.P.Q. (BNA) 285, 287-88 (1971); see, e.g., *Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 1460, 221 U.S.P.Q. (BNA) 481, 487 (Fed. Cir. 1984). Assuming arguendo that these four references are not strictly within the field of art represented by Schwartz, they are easily within a field analogous thereto, and their teachings are properly combinable with the earlier references discussed above. See *Union Carbide Corp. v. American Can Co.*, 724 F.2d 1567, 1572, 220 U.S.P.Q. (BNA) 584, 588 (Fed. Cir. 1984) (quoting *In re Wood*, 599 F.2d 1032, 1036, 202 U.S.P.Q. (BNA) 171, 174 (CCPA 1979)).

Cable faults the district court for failing to make determinations as to how teachings of the references could be combined to produce the patented invention. Nevertheless, the straight-forward quality of the [\*\*25] invention and art involved make the required combination quite apparent. The district court pointed

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out features in each reference; presumably it was these that were to be joined. As to most teachings, several references were cited without delineating a single one of the group for combination with references showing other features. The district court did so apparently to demonstrate the widespread knowledge in the lighting art of each feature involved. As no serious ambiguity resulted, we observe no error in this.

Further, the suggestion to modify the art to produce the claimed invention need not be expressly stated in one or all of the references used to show obviousness. "Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art." *In re Keller*, 642 F.2d 413, 425, 208 U.S.P.Q. (BNA) 871, 881 (CCPA 1981) (and cases cited therein); *Leinoff v. Louis Milona & Sons, Inc.*, 726 F.2d 734, 739, 220 U.S.P.Q. (BNA) 845, 848-49 (Fed. Cir. 1984). The district court in invalidating the Schwartz [\*\*26] patent relied exclusively and correctly on "knowledge clearly present in the prior art." *In re Sernaker*, 702 F.2d 989, 995, 217 U.S.P.Q. (BNA) 1, 6 (Fed. Cir. 1983). In this respect it is to be sustained.

#### E. Hodgetts Declaration

Cable claims that the Hodgetts declaration, if viewed "in a light most favorable" to Cable, raises genuine issues of material fact in relation to the inquiries required by *Graham* dealing with scope and content of the prior art and the differences between that art and the claims at issue. With respect to the references discussed above, the declaration adds little, if anything, not already in the record. While attempting to highlight differences between the teachings of the references and the claimed invention, it largely summarizes their contents and is thus duplicative in a manner which fails to demonstrate any genuine dispute as to issues of material fact and is not helpful in resolving patentability problems. "What we do find helpful is facts of which we would not otherwise be aware." *In re Vamco Machine & Tool, Inc.*, 752 F.2d 1564, 1576, 224 U.S.P.Q. (BNA) 617, 624 (Fed. Cir. 1985). [\*\*27]

The declaration states the opinion that "the patented invention of the Schwartz patent . . . [would] not [have been] obvious to one of ordinary skill in the night light art" from the teachings of the references discussed. Obviousness, however, is a question of law.

Opinion testimony by experts concluding that an invention would or would not have been obvious may influence the court's decision, but conflicting opinions on a legal issue vel non raise no issue of contested fact. Nor is the court's conclusion on obviousness an adverse inference of fact.

*Petersen Manufacturing Co. v. Central Purchasing, Inc.*, 740 F.2d 1541, 1548, 222 U.S.P.Q. (BNA) 562, 567 (Fed. Cir. 1984) (citations omitted).

[\*1026] We reject the contention that the Hodgetts declaration raised contested issues of fact. At most, the declaration offered an *interpretation* of undisputed factual evidence, but did not set forth specific conflicting facts that showed a genuine issue requiring trial.

#### F. Secondary Factors

[\*\*28] In making a determination on obviousness under 35 U.S.C. § 103, *Graham v. John Deere Co.*, 383 U.S. at 17, 148 U.S.P.Q. at 467, sets forth, as providing "background," "several basic factual inquiries," including the content of the prior art, the difference between that art and the claimed subject matter, and the level of ordinary skill in the subject art. In addition, it is suggested that certain "secondary considerations" which "give light to the circumstances surrounding the origin of the [patented] subject matter" may have relevancy as "indicia of obviousness or nonobviousness." *Id.* at 17-18, 148 U.S.P.Q. at 467. The opinions of this court have suggested that evidence on these secondary considerations is to be taken into account *always*, "not just when the decisionmaker remains in doubt after reviewing the art." *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1539, 218 U.S.P.Q. (BNA) 871, 879 (Fed. Cir. 1983). See *Simmons Fastener Corp. v. Illinois Tool Works, Inc.*, 739 F.2d 1573, 1575, 222 U.S.P.Q. (BNA) 744, 746 (Fed. Cir. 1984), [\*\*29] cert. denied, 471 U.S. 1065, 105 S. Ct. 2138, 85 L. Ed. 2d 496 (1985); *Radio Steel & Manufacturing Co. v. MTD Products, Inc.*, 731 F.2d 840, 846, 221 U.S.P.Q. (BNA) 657, 662 (Fed. Cir.), cert. denied, 469 U.S. 831, 105 S. Ct. 119, 83 L. Ed. 2d 62 (1984); *Jones v. Hardy*, 727 F.2d at 1530, 220 U.S.P.Q. at 1027; *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 1549, 220 U.S.P.Q. (BNA) 193, 197 (Fed. Cir. 1983).

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Nevertheless, a "nexus between the merits of the claimed invention and the evidence of secondary considerations is required in order for the evidence to be given substantial significance in an obviousness decision." *Simmons Fastener*, 739 F.2d at 1575, 222 U.S.P.Q. at 746; *Stratoflex*, 713 F.2d at 1539, 218 U.S.P.Q. at 879. Thus, the weight to be accorded evidence on secondary considerations is to be carefully appraised in relation to the facts of the actual case in which it is offered. See *EWP Corp. v. Reliance Universal, Inc.*, 755 F.2d 898, 908, 225 U.S.P.Q. (BNA) 20, 26 (Fed. Cir. 1985); *In re Vamco Machine & Tool, Inc.*, 752 F.2d 1564, 1574-77, 224 U.S.P.Q. 617, 623-25 (Fed. Cir. 1985); [\*\*30] see also Address by D. Chisum, AIPLA Annual Meeting (October 26, 1984), reprinted in 1984 AIPLA Bull. 618, 620 ("secondary not because they are secondary in importance [but] . . . because they are relevant through a process of inference to the ultimate technical issue of nonobviousness [and being] . . . relevant through a chain of inference, their force may be weakened for a variety of reasons").

Cable claims that a trial is required due to the existence of contested issues of material fact regarding (1) the commercial success of the Cable device embodying the claims of the Schwartz patent and (2) the copying of that device by Genmark.

#### 1. Commercial Success.

Cable relies on the declaration of its chief financial officer, George Lema, executed October 31, 1982 (the Lema declaration). Relevant to this issue, it states only the following:

Plaintiff [Cable] began manufacturing its night light in 1978. Since the introduction of that night light, over 5 million units have been sold. Profits of not less than fifty (\$.50) cents per unit have been realized by plaintiff. Plaintiff's night light has been distributed nationwide in major department store chains [\*\*31] and local hardware outlets.

Genmark has not disputed this statement, so it is to be accepted for what it shows. *Union Carbide*, 724 F.2d 1567 at , 220 U.S.P.Q. at 591.

Nevertheless, what it shows in relation to commercial success is fairly minimal. Without further economic evidence, for example, it would be improper to infer that the reported sales represent a substantial share of any definable market or whether [\*\*1027] the profitability per unit is anything out of the ordinary in the industry involved. This type of information might bolster the existence in fact of any commercial success which may be demonstrated by the Lema declaration, but even assuming commercial success were clearly shown, Cable would face an additional hurdle before the Lema declaration could prove pertinent to nonobviousness.

As the district court correctly pointed out in declining to give weight to the Lema declaration on the issue of commercial success as an indicator of nonobviousness, this court in *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 218 U.S.P.Q. (BNA) 871 (Fed. Cir. 1983), has unequivocally stated that [\*\*32] for commercial success of a product embodying a claimed invention to have true relevance to the issue of nonobviousness, that success must be shown to have in some way been due to the nature of the claimed invention, as opposed to other economic and commercial factors unrelated to the technical quality of the patented subject matter. Thus, a "nexus is required between the merits of the claimed invention and the evidence offered, if that evidence is to be given substantial weight enroute to [a] conclusion on the obviousness issue." *Id.* at 1539, 218 U.S.P.Q. at 879. Accord *EWP Corp. v. Reliance Universal, Inc.*, 755 F.2d 898, 908, 225 U.S.P.Q. (BNA) 20, 26 (Fed. Cir. 1985) ("a 'secondary consideration' must be carefully appraised as to its evidentiary value"); *Simmons Fastener Corp. v. Illinois Tool Works, Inc.*, 739 F.2d 1573, 1575, 222 U.S.P.Q. (BNA) 744, 746 (Fed. Cir. 1984), cert. denied, 471 U.S. 1065, 105 S. Ct. 2138, 85 L. Ed. 2d 496 (1985); *In re Vamco Machine & Tool, Inc.*, 752 F.2d 1564, 1577, 224 U.S.P.Q. (BNA) 617, 625 (Fed. Cir. 1985); [\*\*33] see also *Ruben Condenser Co. v. Aerovox Corp.*, 77 F.2d 266, 268 (2d Cir.), cert. denied, 296 U.S. 623, 56 S. Ct. 145, 80 L. Ed. 443 (1935) (where Judge Learned Hand stated, "While it is always the safest course to test a putative invention by what went before and what came after, it is easy to be misled. Nothing is less reliable than uncritically to accept its welcome by the art, even though it displace[s] what went before"). Viewed in a light most favorable to Cable, from the Lema declaration an inference of some commercial success might be deduced, but as to establishing any "nexus" between that hypothetical success and "the merits of the

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claimed invention," no evidence was submitted in the declaration or elsewhere that could justify giving weight to the declaration in reaching a conclusion on obviousness. After considering the Lema declaration the district court correctly determined to accord it no weight.

## 2. Product Copying.

Cable alleges that Genmark copied the Cable night light in designing the accused infringing device and that this alleged copying is evidence of nonobviousness of the Schwartz patent. The evidence in support [\*\*34] of the charge of copying in designing the Genmark product is ambiguous, even viewed in a light favorable to Cable. Deposition testimony of Thomas E. Corder, president of Diablo Technologies, Inc., apparently a successor of Diablo Products Corp., was offered on this point, but Genmark's own characterization of the implication of this evidence was merely that it showed that Corder "had access to and analyzed the appearance of plaintiff's night light during the period he was developing the accused Diablo [later Genmark] night light." Access to, and analysis of, other products in the market is hardly rare, even in the design stages of competing devices. Access in combination with similarity can create a strong inference of copying, but here Cable, as noted by the district court, failed to submit into evidence a sample of its own device for comparative purposes in evaluating the extent of similarity.

The Lema declaration states that "defendant [Genmark] deliberately copied plaintiff's night light when it designed its own night light," but only on information and belief, which under *Fed. R. Civ. P. 56(e)* is an inadequate basis upon which to base affidavits supporting or opposing [\*\*35] summary [\*1028] judgment. n13 Thus, in this instance, product copying at the design stage would be a strained inference.

n13 *Fed. R. Civ. P. 56(e)* states in relevant part:

"Supporting and opposing affidavits shall be made on personal knowledge, shall set forth such facts as would be admissible in evidence, and shall show affirmatively that the affiant is competent to testify to the matters stated therein. Sworn or certified copies of all papers or parts thereof referred to in an affidavit shall be attached thereto or served therewith. The court may permit

affidavits to be supplemented or opposed by depositions, answers to interrogatories, or further affidavits."

Further, in pressing the relevance to nonobviousness of purported copying by Genmark, "as is often the case . . . [Cable] failed to distinguish infringement by a defendant from that of numerous other competitors." Note, *Subtests of "Nonobviousness": [\*\*36] A Nontechnical Approach to Patent Validity*, 112 U. Pa. L. Rev. 1169, 1179 n.51 (1964) (cited in *Graham v. John Deere Co.*, 383 U.S. 1, 18, 148 U.S.P.Q. (BNA) 459, 467, 15 L. Ed. 2d 545, 86 S. Ct. 684 (1966), as relevant to the decision of the Supreme Court to include secondary indicia in the prescribed obviousness determination). It is our conclusion that more than the mere fact of copying by an accused infringer is needed to make that action significant to a determination of the obviousness issue. *Accord Vandenberg v. Dairy Equipment Co.*, 740 F.2d 1560, 1567, 224 U.S.P.Q. (BNA) 195, 199 (Fed. Cir. 1984), where copying of a patented device, despite the failure of protracted efforts by the copyist to design a similar device, was found to be an admission of the mechanical superiority of the patented version, but "not strong evidence of nonobviousness." n14

n14 That is not to say that copying is always irrelevant in the context of other evidence of nonobviousness. See *Jones v. Hardy*, 727 F.2d 1524, 1531, 220 U.S.P.Q. (BNA) 1021, 1026-27 (Fed. Cir. 1984); *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1540, 1541, 218 U.S.P.Q. (BNA) 871, 880 (Fed. Cir. 1983).

[\*\*37]

Rather than supporting a conclusion of obviousness, copying could have occurred out of a general lack of concern for patent property, in which case it weighs neither for nor against the nonobviousness of a specific patent. It may have occurred out of contempt for the specific patent in question, only arguably demonstrating obviousness, or for the ability or willingness of the patentee financially or otherwise to enforce the patent right, which would call for deeper inquiry. Even widespread copying could weigh toward opposite conclusions, depending on the attitudes existing toward patent property and the accepted practices in the industry in question. It is simplistic to assert that copying per se

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should bolster the validity of a patent.

We do not concur in the reasoning evidenced by the statement of the district court that "it is just as likely that the similarity (assuming it exists) is more attributable to the simple obviousness of plaintiff's design rather than to defendant's deliberate mimicry." 582 F. Supp. at 97, 223 U.S.P.Q. at 290. The record simply offers nothing in this regard, and the speculation involved is unwarranted. Nevertheless, in view of Cable's [\*\*38] poor showing as to copying and in view of the barrenness of the record on the "nexus" between any copying arguably shown and the nonobviousness of the claimed invention, it would have been improper to give the alleged copying by Genmark much weight in the obviousness analysis. Thus, the district court treated this issue appropriately, and its comment above as to the reason for copying, if any exists, is but harmless error.

#### G. Disposition

Based on a review of the record as discussed above, it is our conclusion that the patent portion of this case was properly resolved by a grant of summary judgment and that the Schwartz patent is invalid as being directed to obvious subject matter. We can discern no such genuinely disputed questions of fact material to such a judgment as would warrant a trial.

The art involved is easily grasped. The difference between the teaching of each reference and the claimed subject matter is clear, as is how those teachings are to be combined to yield the subject invention. [\*1029] No issue has been raised about the level of skill employed in analysis, that of an ordinary layman of average intelligence and one in this case most favorable to [\*\*39] Cable Electric. Cf. *Chore-Time Equipment, Inc. v. Cumberland*, 713 F.2d 774, 779 n.2, 218 U.S.P.Q. (BNA) 673, 676 n.2 (Fed. Cir. 1983). Secondary considerations for the reasons stated above have been given proper weight.

Cable raises objection to the statement of the district court that it "has no difficulty finding it more likely than not that . . . a shade of the type plaintiff claims . . . [is] an obvious solution" to the problem confronted by plaintiff. Naturally, a determination on the issue of obviousness is no "finding"; it is question of law. Nevertheless, this slip and the concomitant use of the phrase, "more likely than not," are but harmless rhetorical error. Elsewhere throughout the patent opinion the district court shows a

good understanding of the nature of and analysis associated with reaching a conclusion on obviousness. Nor do we agree with Cable that the district court either was "confused as to what the claimed invention in suit was" or failed to consider that invention as a whole.

#### III. THE NONPATENT COUNTS

The district court granted the Genmark motion for summary judgment as to the nonpatent counts of Cable's amended complaint in a [\*\*40] second Memorandum of Opinion and Order dated May 25, 1984 (the second opinion). n15 As the district court ultimately exercised its jurisdiction over the patent count discussed above under the patent provision of 28 U.S.C. § 1338(a), n16 we have jurisdiction also to review the appeal of the remaining nonpatent counts under 28 U.S.C. § 1295(a). n17 *Bandag, Inc. v. Al Bolser's Tire Stores, Inc.*, 750 F.2d 903, 907-09, 223 U.S.P.Q. (BNA) 982, 984-85 (Fed. Cir. 1984). See also *Atari, Inc. v. JS & A Group, Inc.*, 747 F.2d 1422, 223 U.S.P.Q. (BNA) 1074 (Fed. Cir. 1984) (in banc).

n15 See *supra* note 3.

n16 28 U.S.C. § 1338(a) (1982) states:  
"Patents, plant variety protection, copyrights, trademarks, and unfair competition

"(a) The district courts shall have original jurisdiction of any civil action arising under any Act of Congress relating to patents, plant variety protection, copyrights and trademarks. Such jurisdiction shall be exclusive of the courts of the states in patent, plant variety protection and copyright cases."

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n17 28 U.S.C. § 1295(a)(1) (1982) states:  
"Jurisdiction of the United States Court of Appeals for the Federal Circuit

"(a) The United States Court of Appeals for the Federal Circuit shall have exclusive jurisdiction --

"(1) of an appeal from a final decision of a district court of the United States, the United States

770 F.2d 1015, \*1029; 1985 U.S. App. LEXIS 15064, \*\*41;  
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District Court of the District of the Canal Zone, the District Court of Guam, the District Court of the Virgin Islands, or the District Court for the Northern Mariana Islands, if the jurisdiction of that court was based, in whole or in part, on section 1338 of this title, except that a case involving a claim arising under any Act of Congress relating to copyrights or trademarks and no other claims under section 1338(a) shall be governed by sections 1291, 1292, and 1294 of this title[.]"

Nevertheless, in deciding these nonpatent matters we do so "in the light of the problems faced by the district court from which each count originated, including [\*\*42] the law there applicable," *Bandag*, 750 F.2d at 909, 223 U.S.P.Q. at 986, and in the remaining portions of this opinion we will be guided by the relevant law in the Ninth Circuit, to the extent it can be discerned. n18

n18 It has been clearly stated that in appeals to this court under 28 U.S.C. § 1295(a) of cases involving patent and certain nonpatent counts, "it will be the role and duty of the advocates to brief and argue [the nonpatent counts] in the appeal . . . just as if they were appearing . . . before that circuit [from which the case originated]." *Atari*, 747 F.2d at 1440, 223 U.S.P.Q. at 1087. Such a rule could not in all fairness be applied in this case, as both of the appealed summary judgment decisions were argued and decided and all of the appeal briefs to this court were prepared and filed prior to the statement of the rule. Nevertheless, future litigants will be expected to frame their discussion of appealed nonpatent counts appropriately.

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#### A. *Lanham Act Cause of Action*

Cable's federal nonpatent count is an action brought under the Lanham Act § 43(a), 15 U.S.C. § 1125(a)

(1982). In essence, it is charged that the commercial configuration of the Cable night light has [\*1030] come to designate origin, and thus that Genmark's use of an allegedly similar configuration in its own commercial product constitutes a prohibited false designation of origin.

Apart from what must be shown regarding an alleged copy in order to impose liability for copying, protection under the Lanham Act of the physical details and design of a product may be available if such features both (1) have acquired secondary meaning and (2) are nonfunctional. *Vuitton Et Fils S.A. v. J. Young Enterprises, Inc.*, 644 F.2d 769, 772, 210 U.S.P.Q. (BNA) 351, 353-54 (9th Cir. 1981).

The district court concluded that Cable was not entitled to protection as a matter of law, based on the second requirement, by concluding that the functionality of the Cable night light design was beyond dispute. To so conclude, [\*\*44] it focused on the positions of Cable before the United States Patent and Trademark Office in obtaining allowance of the Schwartz utility patent and before the district court in opposing Genmark's motion for summary judgment on the patent count of this case. The argument Cable made was described as to the effect that the "night light's configuration was utilitarian -- indeed, patentably so, providing special advantages in compactness, efficient bulb change, and light diffusion." 586 F. Supp. at 1508, 223 U.S.P.Q. at 293. The district court thus held that Cable was bound by the argument it made on behalf of the nonobviousness of claims in a patent, n19 when the issue under consideration was the functionality of the actual design of a commercial device. In view of the considerations discussed below, the two can hardly be presumed to be even similar questions.

n19 An examination of the specification and prosecution history pertinent to the Schwartz patent, which are before us in the record, reveals no such argument made as to the utilitarian advantages mentioned by the district court. According to the customary practice, the argument of the parties below has not been included among the documents presented for our review. Thus, we are not in a position to verify or deny the correctness of the characterization of the district court, but do, out of deference to its proximity to the participants in argument below and because the matter has not been disputed by

770 F.2d 1015, \*1030; 1985 U.S. App. LEXIS 15064, \*\*44;  
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Cable, defer to its description of those arguments and presume the accuracy thereof for purposes of reaching our decision.

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Nonobviousness is a question of law fully reviewable on appeal. *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 1344, 220 U.S.P.Q. (BNA) 777, 782 (Fed. Cir.), cert. denied, 469 U.S. 830, 105 S. Ct. 116, 83 L. Ed. 2d 60, 225 U.S.P.Q. (BNA) 232 (1984). On the other hand, functionality in the context of this case is a question of a highly factual nature. See *Vuitton*, 644 F.2d at 775, 210 U.S.P.Q. at 356. When the district court ruled on the issue of functionality, it improperly deprived Cable of the right to have a fact-finding tribunal examine the actual evidence which has bearing on the functionality question.

Below it was not a matter of examining the evidence proffered and concluding that there existed "no genuine issue as to any material fact," as required for a grant of summary judgment. *Fed. R. Civ. P.* 56(c). That point in analysis was never reached, because rather than looking to the actual evidence on nonfunctionality, the district court chose to utilize arguments made in relation to the meaning of invalid patent claims as admissions against interest about the factual nature of a product design. It did this, as far as [\*\*46] we can determine, without analytically verifying the soundness for doing so. The court appears not to have considered whether the meaning of those claims was so unavoidably identical to the details of the product design ultimately marketed as to warrant the desirability or suitability of the use of statements about the former as reliable or legally binding admissions about the latter.

In evaluating arguments made on behalf of the right to obtain or retain a patent, the proper object of scrutiny is the meaning of patent claims when compared to the teachings of the prior art. On the other hand, in assessing the right to protection from unfair product copying, the proper object of attention is the actual marketplace design of and marketing practices for an allegedly copied product when compared [\*1031] to those of the alleged copy. The aim of the patent system is to enhance the incentive for useful innovation; the aim of the Lanham Act, section 43(a), even in the context of product simulation, is to protect a trader's established identity. See *International Order of Job's Daughters v. Lindeburg & Co.*, 633 F.2d 912, 918-19, 208 U.S.P.Q. (BNA) 718,

724-25 (9th Cir. 1980), [\*\*47] cert. denied, 452 U.S. 941, 101 S. Ct. 3086, 69 L. Ed. 2d 956, 213 U.S.P.Q. (BNA) 1056 (1981) ("to protect consumers against deceptive designations of the origin of goods and, conversely, to enable producers to differentiate their products from those of others").

In resolving the question of product design functionality for purposes of the Lanham Act, section 43(a), the fact finder is to consider the appearance of the products in issue. Reference to utility patent claims that are, or have been, asserted to read on either product, or to the appearance of the device depicted in figures included in the patent specification supporting such claims, must be done with caution. Cf. *Best Lock Corp. v. Schlage Lock Co.*, 56 C.C.P.A. 1472, 413 F.2d 1195, 1199, 162 U.S.P.Q. (BNA) 552, 556 (1969) (cautioning that "a utility patent is only 'some evidence' as to functionality" in its explanation of statements in *In re Shenango Ceramics, Inc.*, 53 C.C.P.A. 1268, 362 F.2d 287, 292, 150 U.S.P.Q. (BNA) 115, 120 (1966)). See also, *In re Hollaender Manufacturing Co.*, 511 F.2d 1186, 1188, 185 U.S.P.Q. (BNA) 101, 102 (CCPA 1975); [\*\*48] *In re Honeywell, Inc.*, 497 F.2d 1344, 1348, 181 U.S.P.Q. (BNA) 821, 824 (CCPA 1974). Claims may be capable of reading on many devices of strikingly different configuration. Thus, even the fact that the claims read on two commercial devices in the marketplace is not support in itself for a finding that one is a copy of the other or confusingly similar thereto for section 43(a) purposes. A manufacturer may choose in its commercial embodiment of a patented device to less than faithfully replicate the exemplary depiction of a claimed embodiment shown in the figures of the patent. Hence, for purposes of evaluating the existence or impact of product copying, the relevance of patent figures depends on the extent to which their appearance is replicated in the actual marketplace product of the patentee. We have been shown no Ninth Circuit precedent to the contrary.

Concluding that the grant of summary judgment as to Cable's Lanham Act count was improper, we vacate that portion of the case and remand it for further proceedings consistent with the above discussions. To guide [\*\*49] its analysis regarding functionality, the district court is to utilize the ample case law available from the Ninth Circuit.

#### B. State Causes of Action

The two California State causes of action contained

770 F.2d 1015, \*1031; 1985 U.S. App. LEXIS 15064, \*\*49;  
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in Cable's amended complaint will be treated together below. In one, a count for unfair competition, it is charged that Genmark, desiring not to create its own original night light design, but rather to trade upon the good will reposed by the purchasing public in the configuration and packaging of Cable's night light, deliberately copied both. In the other state count, the use of the configuration chosen by Genmark for its night light is alleged to contribute to the dilution and to constitute infringement of Cable's rights in California State trademark registration number 70905, which is apparently substantially identical in appearance to that of Cable's night light.

The district court granted summary judgment as to both state causes, dismissing them for essentially the same reasons. 586 F. Supp. at 1508, 223 U.S.P.Q. at 293. The state counts were said to present a "paradigm case" in which to apply the "established principles of federal preemption" of state-law [\*\*50] intellectual property protection found in *Sears, Roebuck & Co. v. Stiffel Co.*, 376 U.S. 225, 11 L. Ed. 2d 661, 84 S. Ct. 784, 140 U.S.P.Q. (BNA) 524, *reh'g denied*, 376 U.S. 973, 84 S. Ct. 1131, 12 L. Ed. 2d 87 (1964), and *Compcorp Corp. v. Day-Brite Lighting, Inc.*, 376 U.S. 234, 140 U.S.P.Q. (BNA) 528, 11 L. Ed. 2d 669, 84 S. Ct. 779, *reh'g denied*, 377 U.S. 913, 84 S. Ct. 1162, 12 L. Ed. 2d 183 (1964). As an "alternative ground" for its decision, the district court relied on its conclusion mentioned above that the functionality of [\*1032] Cable's product configuration was beyond dispute. That configuration was thus held not to be susceptible to protection under California law, either in the form of a registered state trademark, or as a product capable of being unfairly copied by competitors. *Id.* The error in the conclusion of the district court on functionality has already been addressed in relation to the Lanham Act count. Those same remarks are equally applicable to the dismissal of state causes of action. The discussion which follows will accordingly treat solely the issue of federal-state preemption. [\*\*51]

### 1. Choice of Law

The Federal Circuit is vested with exclusive jurisdiction over the appeals of final decisions in cases before federal district courts only where the jurisdiction of those courts was based in whole or in part on the patent provisions of 28 U.S.C. § 1338. See 28 U.S.C. § 1295(a)(1). n20 In creating this nationwide subject matter jurisdiction in the area of patent appeals, it was the

intention of Congress to provide a forum that would increase doctrinal stability in the area of patent law and reduce forum shopping, which was considered to be common in patent litigation. n21 Nevertheless, section 1295(a)(1) does not limit the jurisdiction of the Federal Circuit over appeals from the district courts exclusively to the review of claims based on the patent laws. When patent claims are joined in the same case with other counts, the appeal of nonpatent counts accompanies the appeal of the patent count to this court. In such "mixed cases" this avoids the bifurcation of appeals between the Federal Circuit and the [\*\*52] regional circuit to which appeals from the district court of nonpatent counts would otherwise be directed. See H.R. Rep. No. 312, 97th Cong., 1st Sess. 41 (1981), quoted and discussed in *Atari, Inc. v. JS & A Group, Inc.*, 747 F.2d 1422, 1435, 223 U.S.P.Q. (BNA) 1074, 1083-84 (Fed. Cir. 1984) (in banc).

n20 See *supra* note 17.

n21 For the legislative history of the statute creating the United States Court of Appeals for the Federal Circuit, the Federal Courts Improvement Act of 1982, Pub. L. No. 97-164, 96 Stat. 25, and the intention of Congress thereby to achieve this uniformity, see S. Rep. No. 97-275, 97th Cong., 2d Sess. 3-6, *reprinted in* 1982 U.S. Code Cong. & Ad. News 11, 13-16. Uniformity was also sought in federal personnel, government contract, and Little Tucker Act cases. 28 U.S.C. § 1295 (1982).

Congress recognized that this solution for reducing forum shopping in patent litigation and for avoiding bifurcated appeals, could through the [\*\*53] joinder of frivolous patent causes of action, for example, "create forum shopping opportunities between the Federal Circuit and the regional courts of appeals on other [nonpatent] claims." S. Rep. No. 97-275, 97th Cong., 2d Sess. 19-20, *reprinted in* 1982 U.S. Code Cong. & Ad. News 11, 30. Several appropriate responses by the circuit courts were recommended. *Id.*

In due course it became apparent that even the joinder of nonfrivolous patent counts with other nonpatent causes of action creates a potential for forum shopping in the appeal of the nonpatent causes.

770 F.2d 1015, \*1032; 1985 U.S. App. LEXIS 15064, \*\*53;  
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Recognizing that the motivation for such appeal forum shopping resides in the perceived opportunity to secure on appeal the application in the nonpatent counts of law differing from that which would otherwise be used in the regional circuit, this court sitting in banc at its own initiative declared in *Atari*, 747 F.2d at 1440, 223 U.S.P.Q. at 1087, its intention in the review of certain nonpatent matters to apply the "discernible law of the involved circuit" from which the appeal originated. n22

n22 This general principle had already been specifically effected by various three-judge panels of this court in reviewing specific procedural matters, *In re Medical Prosthetics Research Associates, Inc.*, 739 F.2d 618, 620 (Fed. Cir. 1984); *W.L. Gore & Associates, Inc. v. International Medical Prosthetics Research Associates, Inc.*, 745 F.2d 1463, 223 U.S.P.Q. (BNA) 884 (Fed. Cir. 1984); *Panduit Corp. v. All States Plastic Manufacturing Co.*, 744 F.2d 1564, 223 U.S.P.Q. (BNA) 465 (Fed. Cir. 1984) (all concerning attorney disqualification), and specific substantive matters. See *American Hoist & Derrick Co. v. Sowa & Sons*, 725 F.2d 1350, 1366-67, 220 U.S.P.Q. (BNA) 763, 775-76 (Fed. Cir.), cert. denied, 469 U.S. 821, 105 S. Ct. 95, 83 L. Ed. 2d 41 (1984) (the necessity of showing relevant market to establish a section 2 Sherman Act violation); *Bandag, Inc. v. Al Bolser's Tire Stores, Inc.*, 750 F.2d 903, 909, 223 U.S.P.Q. (BNA) 982, 986 (Fed. Cir. 1984) (infringement of federally registered trademarks). All were cited in *Atari*, 747 F.2d at 1438-40, 223 U.S.P.Q. at 1086-87, as having recognized the "freedom of the district courts to follow the guidance of their particular circuits in all but the substantive law fields assigned exclusively to this court."

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### [\*1033] 2. Preemption

Notwithstanding the fact that the Supreme Court has made several pronouncements on the interrelationship of the federal patent laws to state protection of intellectual property, n23 we conclude that the proper reach of the preemptive effect of the federal patent laws in relation to the diverse assortment of trade regulation laws existing in the fifty states is not a matter over which this court has a

mandate to unify the law evolved in the regional circuits.

n23 In addition to the *Sears* and *Comco* cases already cited, see, e.g., *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 181 U.S.P.Q. (BNA) 673, 40 L. Ed. 2d 315, 94 S. Ct. 1879 (1974); *Goldstein v. California*, 412 U.S. 546, 178 U.S.P.Q. (BNA) 129, 37 L. Ed. 2d 163, 93 S. Ct. 2303, reh'g denied, 414 U.S. 883, 38 L. Ed. 2d 131, 94 S. Ct. 27 (1973).

This issue [\*\*55] is not one that can come before this court in the appeal of a case that was based at the district court level solely on the patent provisions of 28 U.S.C. § 1338(a). The federal-state preemption question is presented exclusively in state intellectual property causes of action. When a patent cause is joined with a state intellectual property cause of action in a single "mixed" case, and both causes are appealed, the issue of federal-state preemption can reach this court for review. In the absence of a patent count below, the appeal of the state action and the associated preemption issue will be resolved in the regional circuit. Thus, the correct application of the preemption principles voiced in *Sears* and *Comco* is a responsibility which is shared between this court and the regional circuits.

Consequently, under the guidance of *Atari*, when the preemption issue is reviewed in this circuit we will apply the law that has evolved in the regional circuit in [\*\*56] which the case containing the issue was originally tried. Adopting this course will then assure that preemption is applied uniformly in the cases of a given regional circuit, whether they are appealed there or, by including a nonfrivolous patent cause of action, reviewed here. Such a rule will reduce the incentive for forum shopping with respect to a significant threshold issue in state causes of action.

### 3. Disposition

Unfortunately, when it decided whether the state counts pled by Cable in this case were preempted by *Sears* and *Comco*, the district court did not look to the law of the Ninth Circuit for standards or methodology. This was understandable because at that time the gathering consensus of this court regarding the correct body of law under which to review certain nonpatent matters had yet to be announced in our decision in *Atari*.

770 F.2d 1015, \*1033; 1985 U.S. App. LEXIS 15064, \*\*56;  
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n24 Accordingly, neither the district court nor this one has had the benefit of any presentation by the parties on the issue of federal-state preemption in terms of the Ninth Circuit law which is proper to consult in this instance. n25

n24 The district court supported its decision that preemption applies in this case exclusively with the authority of *Litton Systems, Inc. v. Whirlpool Corp.*, 728 F.2d 1423, 1448-49, 221 U.S.P.Q. (BNA) 97, 113 (Fed. Cir. 1984). *Litton* not only preceded the in banc pronouncements on choice of law in *Atari*, but it held that preemption applied to a pair of Minnesota State causes of action without finding it necessary to address the choice of law issue. *Litton* did acknowledge the potential for a choice of law issue as to another nonpatent count there on appeal, a cause of action under section 43(a) of the Lanham Act, but explicitly refrained from resolving that choice in deciding the appeal. The correct body of law to apply in section 43(a) matters was determined subsequently in *Bandag, Inc. v. Al Bolser's Tire Stores, Inc.*, 750 F.2d 903, 909, 223 U.S.P.Q. (BNA) 982, 986 (Fed. Cir. 1984), which was issued on the same day as *Atari*.

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n25 See *supra* note 18.

Accordingly, the grant of summary judgment as to both state actions is vacated, and these counts are remanded for reconsideration [\*1034] by the district court in light of the *Atari* mandate to use local circuit law in doing so. This is done out of fairness to the litigants who should be able in our view to address the state causes in such terms before a decision is rendered. Nevertheless, we do so without making any suggestions as to what would be a correct resolution of the federal-state preemption issue when considered under the law of the Ninth Circuit. n26

n26 But cf. *Petersen Manufacturing Co. v. Central Purchasing, Inc.*, 740 F.2d 1541, 1550 n.10, 222 U.S.P.Q. (BNA) 562, 569 n.10 (Fed. Cir. 1984), where a panel of this court stated in

dicta that the Ninth Circuit precedent, *Tveter v. AB Turn-O-Matic*, 633 F.2d 831, 209 U.S.P.Q. (BNA) 22 (9th Cir. 1980), held in effect that the state law trademark claim in *Petersen* was properly dismissed under *Sears and Compco*.

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#### IV. CONCLUSION

The grant of summary judgment based on the invalidity of the Schwartz patent is affirmed. The grant of summary judgment as to the Lanham Act and the two California State causes of action is vacated. Those causes are remanded for such further proceedings as are rendered appropriate by this opinion.

The conduct of discovery in this case is returned to the sound discretion of the district court. It is free at the request of either party to reconsider or affirm any of its earlier discovery rulings based on the legal issues and factual areas of inquiry that it deems have relevance to this case in view of the above discussions.

AFFIRMED-IN-PART, VACATED-IN-PART,  
AND REMANDED.

#### APPENDIX

In Claim 1 of the Schwartz patent bracketed material and paragraphing have been added below:

1. A portable light-sensitive electrical device capable of being used with and movable between one or more of a number of spaced existing conventional electrical receptacles of the type normally found mounted in walls, or the like, comprising in combination:

[a.] a housing having front, rear, side, top and bottom wall portions,

[b.] an electrical circuit carried within  
[\*\*59] said housing,

[c.] blade means electrically connected to said circuit with portions thereof extending from said housing for removably matingly engaging and being physically mounted to contacts of an electrical receptacle,

[d.] lamp-receiving socket means electrically cooperative with said circuit and whose substantially sole source of current is from said receptacle,

[e.] and light-sensitive means carried by said housing and disposed so as to be able to receive ambient light for controlling current flow from one of said receptacle contacts to said socket means, allowing more current flow to said socket means as ambient light received by said light-sensitive means decreases and lesser current flow to said socket means as said received light increases,

said device being characterized by the absence of need for a power source other than that to which it is connected and

wherein said housing does not cover the receptacle openings and surrounding receptacle portions of the unused receptacle of a duplex receptacle to which the device is connected,

said light sensitive means including a photo conductive cell,

said device [further] including

[i.] an electric light  
[\*\*60] bulb with portions thereof mounted in said socket and

[ii.] a shade of predetermined shape and appearance,

said shade comprising front and side wall portions, said front wall portion having a generally planar surface extending between generally rectangular edges including longer vertically extending edges and relatively shorter horizontally extending edges, said side wall portions extending in a diverging manner generally [\*1035] symmetrically at a predetermined angle greater than 90 degrees away from said front wall portion toward a rearward plane of said housing,

said shade being formed . . . at said front wall portion with a generally polygonal-shaped pattern extending over substantially the entire front wall portion,

said shade further comprising bottom means capable of being swung inwardly to frictionally engage and disengage in a snap-on manner and be mounted to said housing in a position with respect to said housing illustrated in FIG. 1 of the drawing, said shade engagement and disengagement with said housing facilitating repeated replacement of said bulb.

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**CROSS MEDICAL PRODUCTS, INC., Plaintiff-Appellee, v. MEDTRONIC  
SOFAMOR DANEK, INC. and MEDTRONIC SOFAMOR DANEK USA, INC.,  
Defendants-Appellants.**

**05-1043**

**UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT**

*424 F.3d 1293; 2005 U.S. App. LEXIS 21200*

**September 30, 2005, Decided**

**SUBSEQUENT HISTORY:** Rehearing denied by, Rehearing, en banc, denied by *Cross Med. Prods. v. Medtronic Sofamor Danek, Inc.*, 2005 U.S. App. LEXIS 25585 (Fed. Cir., Nov. 8, 2005)

**PRIOR HISTORY:** <sup>[\*\*1]</sup>Appealed from: United States District Court for the Central District of California Senior Judge Gary L. Taylor.

*Cross Med. Prods. v. Medtronic Sofamor Danek, Inc.*, 2005 U.S. Dist. LEXIS 6545 (C.D. Cal., Apr. 8, 2005)

**DISPOSITION:** AFFIRMED-IN-PART, REVERSED-IN-PART, VACATED-IN-PART, AND REMANDED.

**COUNSEL:** Bruce D. Kuyper, Latham & Watkins, LLP, of Los Angeles, California, argued for plaintiff-appellee. With him on the brief were Brian F. McMahon, Mark A. Finkelstein, Allan Z. Litovsky, and Jordan B. Kushner of Costa Mesa, California.

Dirk D. Thomas, Robins, Kaplan, Miller & Ciresi L.L.P., of Washington, DC, argued for defendants-appellants. With him on the brief were Robert A. Auchter, Jan M. Conlin and Munir R. Meghjee, of Minneapolis, Minnesota.

**JUDGES:** Before SCHALL, GAJARSA, and LINN, Circuit Judges.

**OPINION BY:** LINN

**OPINION**

[\*1296] LINN, *Circuit Judge.*

Medtronic Sofamor Danek, Inc. et al. ("Medtronic") appeals from an order of the United States District Court for the Central District of California ("district court") permanently enjoining Medtronic from infringing claim 5 of *U.S. Patent No. 5,474,555* ("the '555 patent") owned by Cross Medical Products, Inc. ("Cross Medical"). See *Cross Med. Prods., Inc. v. Medtronic Sofamor Danek, Inc.*, 2004 U.S. Dist. LEXIS 27643, No. SA CV 03-110-GLT(ANx) (C.D. Cal. Sept. 28, 2004). The [\*1297] permanent <sup>[\*\*2]</sup> injunction was issued following the grant of Cross Medical's motions for partial summary judgment of validity and infringement. See *Cross Med. Prods., Inc. v. Medtronic Sofamor Danek, Inc.*, 2004 U.S. Dist. LEXIS 27644, No. SA CV 03-110-GLT(ANx) (C.D. Cal. Aug. 19, 2004) ("Invalidity Opinion"); *Cross Med. Prods., Inc. v. Medtronic Sofamor Danek, Inc.*, 2004 U.S. Dist. LEXIS 14183, No. SA CV 03-110-GLT(ANx) (C.D. Cal. May 20, 2004) ("Infringement Opinion"). As a threshold matter, we conclude, over Cross Medical's objection, that we have jurisdiction over this appeal. On Medtronic's challenge to the district court's claim construction rulings, we affirm the district court's construction of the "anchoring means," "securing means," and "bear against said channel limitations, but modify the district court's construction of the "anchor seat means" and "operatively joined" limitations. Because we find genuine issues of material fact regarding infringement, we reverse the grant of Cross Medical's motion for partial summary judgment of infringement and find no abuse of discretion in the denial of Medtronic's cross-motion for partial summary judgment of non-infringement. We also reverse the grant

of Cross Medical's motion for partial [\*\*3] summary judgment that claim 5 is not obvious but affirm the grant of that motion as to indefiniteness and anticipation. We further conclude that the district court did not abuse its discretion in denying Medtronic's cross-motion for summary judgment as to these invalidity issues. Consequently, we vacate the permanent injunction. Thus, we affirm-in-part, reverse-in-part, vacate-in-part, and remand.

## I. BACKGROUND

This appeal involves orthopedic surgical implants used to stabilize and align the bones of a patient's spine. A common problem with spinal fixation is determining how to secure the fixation device to the spine without damaging the spinal cord. Methods of fixation have developed which utilize wires that extend through the spinal canal and hold a rod against the lamina,<sup>1</sup> or that utilize pedicular screws which extend into the pedicle<sup>2</sup> and secure a plate which extends across vertebral segments. The system taught in *U.S. Patent No. 4,805,602* ("the '602 patent"), which is also assigned to Cross Medical and is part of the case against Medtronic but not involved in this appeal, exemplifies the advantages of both methods. The screw and rod system of the '602 patent provides a rigidity [\*\*4] which is intermediate between wired implant and plate systems. Several screw and rod systems are known in the art. Those which feature an anchor secured to the bone by a separate screw are termed "polyaxial." Polyaxial screws have a capability of pivoting in the anchor. Devices in which the anchor and the bone screw form a unitary body are deemed "monoaxial." Monoaxial screws have no ability to pivot relative to the anchor.

1 The "lamina" is part of the neural arch of a vertebra extending from the pedicle to the median line.

2 The "pedicle" is the basal part of each side of the neural arch of a vertebra connecting the laminae with the centrum.

Cross Medical's '555 patent discloses a device, an embodiment of which is illustrated in Figures 1, 2, and 3 below:

[\*1298] GET DRAWING SHEET 1 OF 7

GET DRAWING SHEET 1 OF 7

## GET DRAWING SHEET 1 OF 7

The '555 device allows a surgeon to place a series of bone screws 21, each carrying an anchor seat 23, into the bones of a patient. A stabilization rod 18 thereafter may be positioned in the channels 51, 52 of the anchor seats. The '555 device allows surgeons to secure the rod to the anchor seats with top-tightening [\*\*5] nuts 27. By connecting the rod in this fashion to the anchors on adjacent spinal bones, the position of the patient's spine may be fixed as desired by the surgeon.

On February 4, 2003, Cross Medical filed suit alleging that certain of Medtronic's polyaxial screws--MAS, Vertex, M8, Sextant, M10, Legacy 4.5, and Legacy 5.5--infringe the '555 patent and *U.S. Patent No. 5,466,237* ("the '237 patent"). The accused devices employ a "set screw," which features external threads to mate with the receiver member's internal threads, to hold the rod in the receiver member. The accused devices also include a "crown member" that lies between the rod and the bone screw. An illustration of the accused device follows, with explanatory text added.

(SEE ILLUSTRATION IN ORIGINAL)

Medtronic denied infringement and counterclaimed seeking a declaratory judgment of non-infringement and invalidity. Subsequent to the initial pleading, responses and amended pleadings added claims and counterclaims relating to several additional patents, including the '602 patent. The district court resolved several issues through summary adjudication. Of importance to this appeal, the district [\*1299] court separately entertained [\*\*6] motions for partial summary judgment of infringement and validity of claim 5 of the '555 patent.

Claim 5 recites:

A fixation device for the posterior stabilization of one or more bone segments of the spine, comprising:

at least two anchors and an elongated stabilizer comprising a rod having a diameter and a longitudinal axis, said anchors each comprising anchoring means which secure said anchors to said bone segment and an anchor seat means which has a lower bone interface operatively joined to said bone segment and an anchor

seat portion spaced apart from said bone interface including a channel to receive said rod; and

*securing means* which cooperate with each of said anchor seat portions spaced apart from said bone interface and exterior to the bone relative to said elongated rod, said seat means including a vertical axis and first threads which extend in the direction of said vertical axis toward said lower bone interface to a depth below the diameter of the rod when it is in the rod receiving channel, and said securing means including second threads which cooperate with the first threads of the seat means to cause said rod to *bear against said* [\*\*7] *channel* through the application of substantially equal compressive forces by said securing means in the direction of the vertical axis and applied on either side along said longitudinal axis of said channel.

'555 patent, col. 8, ll. 33-57 (emphases added).

On May 29, 2004, the district court construed the "operatively joined," "securing means," and "bear against said channel" limitations of claim 5 of the '555 patent. Based on these constructions, the court granted Cross Medical's motion for partial summary judgment of infringement, and denied Medtronic's cross-motion for partial summary judgment of non-infringement. On August 19, 2004, the district court additionally construed the "anchor seat means" and "anchoring means" limitations of claim 5 of the '555 patent. The court then denied Medtronic's motion for partial summary judgment that claim 5 was anticipated, obvious, and indefinite, and granted Cross Medical's cross-motion for partial summary judgment that claim 5 was neither anticipated, obvious, nor indefinite.

On September 28, 2004, with proceedings still on-going with respect to the '555 patent and other patents-in-suit, the district court granted Cross Medical's [\*\*8] motion for a permanent injunction to preclude Medtronic's infringement of claim 5 of the '555 patent. The district court presumed irreparable harm because Cross Medical had prevailed on the merits at the summary judgment stage. Medtronic argued that there

could be no harm because it withdrew all of the asserted infringing devices from the market; however, the district court found that some of the infringing products remained available and that Medtronic had the capacity to bring infringing product back to market. On October 4, 2004, the district court stayed the injunction for 90 days to allow Medtronic time to appeal.

On October 13, 2004, Medtronic appealed from the order granting the injunction, asserting jurisdiction under 28 U.S.C. § 1292(a)(1), (c)(1). Medtronic asks this court to review the district court's claim construction rulings, reverse or vacate the district court's partial summary judgment orders on infringement, indefiniteness, anticipation, and obviousness with respect to claim 5 of the '555 patent, and vacate the permanent injunction. On November 19, 2004, Cross Medical filed a motion to dismiss this appeal for lack of jurisdiction.

## [\*1300] II. DISCUSSION

### [\*\*9] A. Jurisdiction

"Whether this court has jurisdiction over an appeal taken from a district court judgment is a question of law which we address in the first instance." *Pause Tech. LLC v. TiVo Inc.*, 401 F.3d 1290, 1292 (Fed. Cir. 2005). Section 1292(a)(1) provides that the court of appeals has jurisdiction over appeals from interlocutory orders "granting, continuing, modifying, refusing or dissolving injunctions, or refusing to dissolve or modify injunctions." 28 U.S.C. § 1292(a)(1) (2000). Section 1292(c)(1) provides this court exclusive jurisdiction over an appeal of an interlocutory order granting an injunction if we would otherwise have jurisdiction under § 1295. *Id.* § 1292(c)(1). Medtronic appeals from an order permanently enjoining Medtronic from infringing the '555 patent. On its face, the order falls within the scope of § 1292(a)(1), (c)(1).

Cross Medical argues that under *Woodard v. Sage Products, Inc.*, 818 F.2d 841 (Fed. Cir. 1987) (en banc), this court does not possess jurisdiction because the injunction is one in form but not substance. Cross Medical asserts that the injunction is not coercive because it [\*\*10] enjoins Medtronic from engaging in activities it had abandoned before the injunction issued. Cross Medical asserts that Medtronic simply should have sought a stay of the injunction pending appeal under *Federal Rule of Appellate Procedure 8(a)*. Alternatively, Cross Medical argues that even if the court has

jurisdiction to review the order, it has no jurisdiction to reverse or vacate the partial summary judgment rulings because no final judgment on the '555 patent has been entered, and the orders were not certified for appeal.

Medtronic counters that the order falls under § 1292(a)(1), (c)(1). Medtronic asserts that *Sage Products* is inapposite and that no case has denied jurisdiction in an appeal from the grant of an injunction. Medtronic states that Cross Medical argued below that the injunction was necessary to prevent irreparable harm, that Medtronic pulled products from the market to avoid a willfulness finding, that the district court entered the injunction with full knowledge of Medtronic's actions, and that it would be unfair to deny Medtronic its statutory right of appeal.

Cross Medical's reliance on *Sage Products* is misplaced. [\*\*11] In *Sage Products*, plaintiff's amended complaint included a prayer for injunctive relief, and the issue was whether plaintiff could lodge an appeal under § 1292(a)(1) from an order granting defendant's motion for summary judgment of non-infringement. 818 F.2d at 843-44. There was no order specifically denying injunctive relief. *Id.* Instead, plaintiff argued that the adverse summary judgment ruling had the effect of denying injunctive relief. *Id.* at 844. This court sitting en banc considered the impact of the Supreme Court's then recent decision in *Carson v. American Brands, Inc.*, 450 U.S. 79, 67 L. Ed. 2d 59, 101 S. Ct. 993 (1981). We explained that *Carson* "instructed that an interlocutory appeal under section 1292(a)(1) requires (a) that the order be injunctive in nature, (b) that it cause a serious, if not irreparable, consequence, and (c) that the order can be effectively challenged only by immediate appeal." *Sage Products*, 818 F.2d at 849. We held that Woodard failed to establish that the order met the *Carson* requirements. *Id.* at 855.

However, in reporting on how other courts interpreted *Carson* [\*\*12], we criticized the Seventh Circuit for applying "the *Carson* requirements to an order explicitly granting an injunction," observing that "the Supreme Court in *Carson* expressly limited its holding to orders that have 'the practical effect of refusing an' injunction. [\*1301] *Id.* at 850 n.6 (quoting *Carson*, 450 U.S. at 84). We explained that "as a rule of general applicability to orders deemed to deny injunctions, the *Carson* rule is workable and sensibly balances the statutory provisions of sections 1291 and 1292(a)(1) in light of their respective purposes." *Id.* at 853. The

Supreme Court subsequently confirmed our reading of *Carson* as applying only to orders that have "the practical effect of granting or denying injunctions." *Gulfstream Aerospace Corp. v. Mayacamas Corp.*, 485 U.S. 271, 287-88, 99 L. Ed. 2d 296, 108 S. Ct. 1133 (1988) ("Section 1292(a)(1) will, of course, continue to provide appellate jurisdiction over orders that grant or deny injunctions and orders that have the practical effect of granting or denying injunctions and have ""serious, perhaps irreparable, "" consequence." (quoting *Carson*, 450 U.S. at 84 [\*\*13] (quoting *Baltimore Contractors, Inc. v. Bodinger*, 348 U.S. 176, 181, 99 L. Ed. 233, 75 S. Ct. 249 (1955))); see also 19 James Wm. Moore et al., *Moore's Federal Practice* P203.10[2][a], at 12 (3d ed. 2005) ("Moore's") ("While the statute clearly applies to orders that formally grant injunctive relief, it also authorizes interlocutory appeals from orders that have the practical effect of granting an injunction."). Therefore, "if the district court's order expressly grants an injunction, the order is appealable under § 1292(a)(1), without regard to whether the appellant is able to demonstrate serious or irreparable consequences." *Moore's* P203.10[2][a], at 14.

In this case, the district court entered an order expressly enjoining Medtronic from infringing claim 5 of the '555 patent. Thus, *Carson* is inapplicable. See *PIN/NIP, Inc. v. Platte Chem. Co.*, 304 F.3d 1235, 1242 (Fed. Cir. 2002) (finding jurisdiction without referring to the *Carson* test because "the district court's grant of a permanent injunction ...[brought the] appeal squarely within the confines of § 1292(a)(1)"). On appeal from the district court's grant of the injunction, [\*\*14] we have jurisdiction under 28 U.S.C. § 1292(a)(1).

Moreover, we may review the underlying partial summary judgment orders because they are inseparably connected to the merits of the permanent injunction. See *id.* at 1242-48 (reviewing a summary judgment ruling that a claim was not anticipated by the prior art where jurisdiction was based on § 1292(a)(1), (c)(1)); *Katz v. Lear Siegler, Inc.*, 909 F.2d 1459, 1461 (Fed. Cir. 1990) (reviewing propriety of joinder of counter-defendant on appeal from injunction); *Moore's* P203.10[7][b], at 45-47 ("[An interlocutory appeal under § 1292(a)(1)] enables the circuit court to review other orders that are inseparably or very closely connected with the merits of the injunctive order ...."). The district court presumed irreparable harm based on Cross Medical's success on the merits, which manifested itself in the summary judgment

orders concerning claim 5. Because Cross Medical's success on the merits turns on the propriety of the summary judgment rulings, our review of the grant of the permanent injunction requires that we rule on the summary judgment orders. See *Mendenhall v. Barber-Greene Co.*, 26 F.3d 1573, 1581 n.12 (Fed. Cir. 1994) [\*\*15] (noting "that an interlocutory appeal from a permanent injunction, to the extent that it considers questions of validity and infringement ...is identical in substance to an appeal brought under § 1292(c)(2)"). The cases cited by Cross Medical are not germane.

For these reasons, Cross Medical's motion to dismiss the appeal for lack of jurisdiction is denied.

#### B. Standard of Review

"We review the grant of a permanent injunction for an abuse of discretion which [\*1302] requires plenary review of the correctness of ...rulings on matters of law." *Stratos Mobile Networks USA, LLC v. United States*, 213 F.3d 1375, 1379 (Fed. Cir. 2000) (internal quotations omitted). We review the grant of a motion for summary judgment *de novo*. *Id.* However, we review the denial of a motion for summary judgment for abuse of discretion. *Gart v. Logitech, Inc.*, 254 F.3d 1334, 1338 (Fed. Cir. 2001). Summary judgment should only be granted "if the pleadings, depositions, answers to interrogatories, and admissions on file, together with the affidavits, if any, show that there is no genuine issue as to any material fact and that the moving party is entitled to a judgment as [\*\*16] a matter of law." *Fed. R. Civ. P.* 56(c). In applying this standard, "the evidence of the non-movant is to be believed, and all justifiable inferences are to be drawn in [the non-movant's] favor." *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 255, 91 L. Ed. 2d 202, 106 S. Ct. 2505 (1986). "The fact that both the parties have moved for summary judgment does not mean that the court must grant summary judgment to one party or the other....Cross-motions are no more than a claim by each party that it alone is entitled to summary judgment, and the court must evaluate each motion on its own merits, taking care in each instance to view the evidence in favor of the nonmoving party." *Bubble Room, Inc. v. United States*, 159 F.3d 553, 561 (Fed. Cir. 1998) (internal citation omitted); *accord Gart*, 254 F.3d at 1338-39.

Claim construction is a question of law reviewed *de novo*. See *Phillips v. AWH Corp.*, 415 F.3d 1303, 1328 (Fed. Cir. 2005) (en banc). Determination of

infringement is a factual question. *Bai v. L & L Wings, Inc.*, 160 F.3d 1350, 1353 (Fed. Cir. 1998). "Indefiniteness, [\*\*17] ...like claim construction, is a question of law that we review *de novo*." *Atmel Corp. v. Info. Storage Devices*, 198 F.3d 1374, 1378 (Fed. Cir. 1999). Anticipation is a question of fact. *Advanced Display Sys., Inc. v. Kent State Univ.*, 212 F.3d 1272, 1281 (Fed. Cir. 2000). "Obviousness is a question of law based on underlying facts." *Group One Ltd. v. Hallmark Cards, Inc.*, 407 F.3d 1297, 1303 (Fed. Cir. 2005).

#### C. Claim Construction

In the course of its rulings on partial summary judgment for both infringement and validity, the district court construed the "anchoring means," "anchor seat means," "operatively joined," "securing means," and "bear against said channel" limitations of claim 5. Medtronic challenges each construction.

##### 1. "anchors each comprising anchoring means ...and anchor seat means"

In the district court, the parties disputed whether either the "anchoring means" limitation or "anchor seat means" limitation imposed a requirement that the bone screws be polyaxial. The district court did not construe each limitation separately. Instead, the district court referred to its prior ruling in [\*\*18] *Cross Med. Prods. v. Depuy Acromed, Inc.*, 2003 U.S. Dist. LEXIS 26720, No. SA CV 00-876-GLT(ANx), (C.D. Cal. Jan. 9, 2003), and explained that both the "anchoring means" and "anchor seat means" limitations were in § 112, P6 form and "must be construed by referring to the specification." *Invalidity Opinion* 2004 U.S. Dist. LEXIS 27644, [WL] at 3-4. The district court held that "although the claim language itself does not indicate whether the screws are polyaxial or monoaxial, the specifications and the drawings establish that the claims are limited to polyaxial screws." 2004 U.S. Dist. LEXIS 27644, [WL] at 3.

Medtronic asserts that although the preferred embodiment describes a polyaxial screw, there is no basis to read this feature into claim 5 because neither "anchoring means" nor "anchor seat means" are [\*1303] § 112, P6 limitations. Medtronic argues that even if these are § 112, P6 limitations, a monoaxial screw is an alternative embodiment and, thus, should be considered corresponding structure, citing *Micro Chemical, Inc. v. Great Plains Chemical Co.*, 194 F.3d 1250 (Fed. Cir. 1999). Medtronic also relies on the doctrine of claim

differentiation, arguing that the recitation in claim 1 of a polyaxial screw limitation implies that claim 5 does not possess that [\*\*19] limitation. Finally, Medtronic adds that Cross Medical is estopped from denying that claim 5 covers monoaxial screws because Cross Medical marked its monoaxial screws with the '555 patent number.

Cross Medical counters that both "anchoring means" and "anchor seat means" are § 112, P6 limitations and their corresponding structure is a polyaxial screw. Cross Medical argues that claim differentiation must give way to a proper § 112, P6 analysis and that the court should not consider "marking estoppel" in construing claim 5 because marking is extrinsic evidence. Cross Medical adds that claims should be construed to preserve their validity.

The limitations at issue are contained in the following text of claim 5:

said anchors each comprise *anchoring means* which secure said anchors to said bone segment and an anchor seat means which has a lower bone interface operatively joined to said bone segment and an anchor seat portion spaced apart from said bone interface including a channel to receive said rod....

...said *seat means* including a vertical axis and first threads which extend in the direction of said vertical axis toward said lower bone interface to a depth below [\*\*20] the diameter of the rod when it is in the rod receiving channel ....

'555 patent, col. 8, ll. 36-43, 46-51 (emphases added).

#### a. "anchoring means"

The limitation recites the word "means," which gives rise to the presumption that § 112, P6 applies. See *Rodime PLC v. Seagate Tech., Inc.*, 174 F.3d 1294, 1302 (Fed. Cir. 1999). The claimed function of the "anchoring means" is to "secure said anchors to said bone segment." '555 patent, col. 8, ll. 38-39. No structure is recited in the claim to perform this function. See *id.*, ll. 35-56. Thus, § 112, P6 applies and the "claim shall be construed to cover the corresponding structure ...described in the specification and equivalents thereof." 35 U.S.C. § 112, P6 (2000); *Al-Site Corp. v. VSI Int'l, Inc.*, 174 F.3d 1308,

1320 (Fed. Cir. 1999).

The specification discloses only one embodiment. That embodiment contains a screw which carries a separate anchor such that "when the screw 21 engages the anchor seat 23, a limited ball-and-socket joint is formed which permits freedom of movement between the rod support 23 and the screw 21." '555 patent, col. 5, ll. 4-7. The specification [\*\*21] unambiguously states that a feature of the "present invention" is that "each anchor seat is secured by a cancellous screw which cooperates through a sloped bore in the anchor seat so as to provide a limited ball and socket motion." *Id.*, col. 1, l. 65--col. 2, l. 21. It continues:

The present invention utilizes a rod and vertebral anchors which holds [sic] the rod in position. Each anchor is secured to the vertebrae by a transpedicular screw member.

....

...The present design utilizes two implant sets on either side of the spinous processes. Each implant set includes a ...rod .... Generally, an implant set is used on each side of the spinous process ....The rod is held in position by a stainless steel vertebral anchor which captures the rods. *The [\*\*1304] anchor has a seat member which is secured to the vertebrae by a stainless steel transpedicular screw. The screw is separate from the anchor seat and thus provides for limited motion between the anchor seat and the vertebrae.*

*Id.*, col. 3, ll. 26-67 (emphas is added). The patent discloses no other structure for securing the anchor to the bone. The patent states that the polyaxial design "acts as a 'shock-absorber' [\*\*22] to prevent direct transfer of load from the rod to the bone-screw interface prior to achieving bony fusion, thereby decreasing the chance of failure." *Id.*, ll. 63-67. Thus, the district court was correct both in linking the recited function to the structure disclosed in the specification and in concluding that the corresponding structure was polyaxial. Medtronic argues that even if the limitation is a means-plus-function limitation linked to the disclosed polyaxial structure, the

claim nonetheless should be construed to include alternative structures like monoaxial screws. However, because there is only one embodiment described in the specification to secure the anchor to the bone--a polyaxial screw and anchor structure--there is no basis on which to extend the limitation to cover alternative, non-disclosed structure not shown to be structurally equivalent. *See 35 U.S.C. § 112, P6; Al-Site, 174 F.3d at 1320.*

We reject the parties' remaining arguments. First, although the doctrine of claim differentiation suggests that claim 5 should be broader than claim 1, any presumption that the claims differ with respect to this feature may be overcome [\*\*23] by a contrary construction mandated by the application of § 112, P6. *See Laitram Corp. v. Rexnord, Inc., 939 F.2d 1533, 1538 (Fed. Cir. 1991)* (holding that the doctrine of claim differentiation yields to an interpretation mandated by § 112, P6). Second, Medtronic's assertion that "marking estoppel" applies is incorrect. Even if Cross Medical marked monoaxial screws with the '555 patent number, such evidence conflicts with the intrinsic record and has no bearing on our construction. *See Phillips, 415 F.3d at 1318* ("[A] court should discount [extrinsic evidence] that is clearly at odds with the claim construction mandated by the claims themselves, the written description, and the prosecution history, in other words, with the written record of the patent." (internal quotation omitted)); cf. *SmithKline Diagnostics v. Helena Labs. Corp., 859 F.2d 878, 890-91 (Fed. Cir. 1988)* (holding that an accused infringer's mis-marking of a product could not convert by estoppel an admittedly non-infringing product into an infringing product). Finally, Cross Medical's argument that we should consider the validity of claim 5 in construing [\*\*24] the limitation misses the mark. Because the other claim construction tools unambiguously resolve the claim construction dispute, considering validity would be improper. *Phillips, 415 F.3d at 1327* ("We have limited the maxim [of construing a claim to preserve its validity] to cases in which 'the court concludes, after applying all the available tools of claim construction, that the claim is still ambiguous.'").

#### b. "anchor seat means"

While the limitation recites the word "means," thus giving rise to the presumption that § 112, P6 applies, *see Rodime, 174 F.3d at 1302*, the claim language is sufficiently structural as to take the limitation out of the ambit of § 112, P6. Thus, the district court erred in

treating "anchor seat means" as a means-plus-function limitation; however, that error is harmless with respect to the conclusion that the claim covers polyaxial structures, based on the district court's correct construction of the "anchoring means" limitation, discussed *supra*.

#### [\*1305] 2. "operatively joined"

The district court construed "lower bone interface operatively joined to said bone segment" to mean "connected during a surgical procedure. [\*\*25] "Infringement Opinion 2004 U.S. Dist. LEXIS 14183, [WLJ at 5. The district court interpreted "connect" to mean "in contact." *See id.* & n. 2. The district court reasoned that because the claim involves a surgical procedure, "operatively" means "involving surgical operations." *Id.* The district court explained that construing "operatively" to mean "to produce an appropriate effect" would improperly import a limitation from the specification. 2004 U.S. Dist. LEXIS 14183, [WLJ at 4-5.

Medtronic argues that the "bone interface" language surrounding the phrase "operatively joined" requires that there be contact between the bone segment and the anchor seat. Medtronic asserts that "operatively" means to produce an effect and that effect is micro-motion, which Medtronic describes as "limited motion" between the anchor and the bone. Medtronic argues that it would be inconsistent to construe claim 5 to require a polyaxial screw which enables polyaxial movement, but not to require a micro-motion effect. Medtronic adds that the district court's construction renders "operatively" superfluous because the only way to attach the screw to bone is via surgery.

Cross Medical counters that the "bone interface" is the portion of the anchor seat that [\*\*26] comes into contact with the bone when there is contact, but that "bone interface" does not require contact. Cross Medical argues that the district court correctly construed "operatively" to mean "surgically." Cross Medical asserts that even if we construe "operatively" to mean "effectively," the effect is posterior stabilization, not micro-motion. Cross Medical adds that "polyaxial" and "micro-motion" are not synonymous.

The claim recites an "anchor seat means which has a lower bone interface operatively joined to said bone segment." '555 patent, col. 8, ll. 39-42. The claim does not state explicitly whether the "bone interface" and the

"bone segment" must be in contact. However, we may refer to the dictionary to begin understanding the ordinary meaning of these claim terms, "so long as the dictionary definition does not contradict any definition found in or ascertained by a reading of the patent documents." *Phillips*, 415 F.3d at 1322-23 (internal quotations omitted). "Bone" modifies "interface," indicating that the anchor seat has a "lower" portion that may share a "common boundary" with "bone." See *Webster's Third New Int'l Dictionary* 1178 (2002) (defining "interface"). [\*\*27] The term "joined" describes the relationship between the "bone interface" and the "bone segment." Use of the word "joined" indicates that the "interface" and the "bone" must be brought together or connected to form a single unit, a whole, or a continuity, and thus that the interface and the bone are in contact. See *id.* at 1218 (defining "join").

The written description confirms that the interface must contact the bone. The screw is separate from the anchor seat, which prevents the direct transfer of load from the rod to the "bone-screw interface," and decreases the chance of failure of the "bone-screw interface." *Id.*, col. 3, ll. 19-22, ll. 64-67. This use of the term "interface" is consistent with its meaning a "common boundary" between two parts. Moreover, the patent refers to the "anchor" as being held, '555 patent, Abstract, or "secured" to the bone, *id.*, col. 3, ll. 59-60, and to the point of attachment as a "fusion bed," *id.*, col. 7, l. 15. These references suggest contact between the anchor seat and the bone. Furthermore, to adjust the height of the anchor posterior to the bone, the patent teaches the addition of washers that are the same diameter as the anchor [\*\*28] seat. *Id.*, col. 5, ll. 50-57. The [\*1306] washers co-act with the anchor seat to function as the bone interface while elevating the seat. If contact with bone were not contemplated, then there would be little need to add washers to elevate the seat. The drawings show contact between the anchor and bone, which is consistent with the description. *Id.*, Figures 3, 14, 17-20. Because the ordinary meaning of "interface" and "joined," as reflected in dictionary definitions and in the overall context of the intrinsic record, leads to the conclusion that a person of ordinary skill in the art would have understood these terms to require "contact" between the interface and the bone, the district court's construction in this regard was correct. It would be improper to construe "joined" more broadly to mean "connected" without requiring contact.

As to "operatively," the term is often used descriptively in patent drafting to mean "effectively" in describing the functional relationship between claimed components. See, e.g., *Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1118 (Fed. Cir. 2004) ("[Operatively connected] is a general descriptive [\*\*29] term frequently used in patent drafting to reflect a functional relationship between claimed components."). Here, the preamble of the claim recites that the invention is operative when it effects posterior stabilization of one or more bone segments of the spine. '555 patent, col. 8, ll. 33-34; see *Innova*, 381 F.3d at 1118 (declining to decide whether preamble was an affirmative limitation, but recognizing that preamble recited the intended use corresponding to "operatively"). The body of the claim is consistent as it calls for anchors and a stabilizer rod, and provides detail on how these structures interrelate to stabilize the bone segment. See '555 patent, col. 8, ll. 35-57; *Innova*, 381 F.3d at 1118-19 (looking to the body of the claim to understand the purpose). Although the written description does not define "operatively," it consistently describes the purpose of the device to be for posterior stabilization. See '555 patent, col. 1, ll. 9-12 ("This invention relates generally to an apparatus for immobilization of the spine, and more particularly, to an apparatus for posterior internal fixation of the spine ...."); *Innova*, 381 F.3d at 1118-19 [\*\*30] (looking to the written description to understand the purpose). It discusses disadvantages of prior art spinal fixation methods and apparatuses, '555 patent, col. 1, ll. 13-64; col. 2, l. 36--col. 3, l. 25, details how the invention's features provide an advantageous fixation system, *id.*, col. 3, l. 26--col. 6, l. 44, and provides a method of spinal fixation therapy for use with the device, *id.*, col. 6, l. 45--col. 7, l. 50. Therefore, from the context of the written description, it is clear that one of ordinary skill in the art would have understood "operatively" to mean effective to produce posterior stabilization. The district court erred in construing "operatively" to mean "surgically." Because the only way a "fixation device" can provide "posterior stabilization" is through a surgical procedure, construing "operatively" to mean "surgically" renders the word superfluous, as used in the claim.

For all of these reasons, we modify the district court's claim construction and conclude that, in claim 5, the "lower bone interface [is] operatively joined to said bone segment" when the interface and the bone segment are connected and in contact such that the device is effective [\*\*31] to perform posterior stabilization.

### 3. "securing means"

The district court considered the "securing means" limitation to be in § 112, P6 form, and described its function as "applying a force to the rod, which compresses the rod against the anchor seats and secures the rod in place." *Infringement Opinion 2004 U.S. Dist. LEXIS 14183, [WL] at 6.* The district court explained [\*1307] that compression must be applied on "either side"--either inside or outside--of the rod-receiving channel. *2004 U.S. Dist. LEXIS 14183, [WL] at 7.* The district court identified the corresponding structure as an "outer nut." *2004 U.S. Dist. LEXIS 14183, [WL] at 6.*

Medtronic argues that the district court's interpretation of the function of the "securing means" somehow ignores the claim language: "through the application of substantially equal compressive forces ...*applied on either side along said longitudinal axis of said channel.*" '555 patent, col. 8, ll. 54-57 (emphasis added). Medtronic asserts that this language mandates that forces be applied along the longitudinal axis of the rod on "either side" of the channel and not on "either side" of the vertical axis. Medtronic interprets "either side" of the channel to be on the "outside" of the channel. Although Medtronic does not dispute [\*32] that the corresponding structure is an external nut, Medtronic argues that the written description and prosecution history show a disavowal of equivalents to an external nut.

Cross Medical responds that the district court did not ignore the "either side" limitation, and that, in any event, "either side" can mean that the forces are applied "inside" the channel. Cross Medical provides the illustration that standing on "either side" of the room would connote standing inside the room. Cross Medical adds that the specification and prosecution history do not evince a disavowal, and that claim differentiation doctrine supports structural equivalents.

The claim requires:

at least two anchors and an elongated stabilizer comprising a rod having a diameter and a longitudinal axis ....

securing means which cooperate with each of said anchor seat portions ...said securing means including second threads which cooperate with the first threads of

the seat means to cause said rod to bear against said channel through the application of substantially equal compressive forces by said securing means in the direction of the vertical axis and applied on either side along said longitudinal [\*33] axis of said channel.

'555 patent, col. 8, ll. 36-37, 44-57.

We agree with the parties that the limitation is in § 112, P6 format. *See Rodime, 174 F.3d at 1302* (noting that a concession by the parties that the claim is in § 112, P6 form does not relieve the court of its duty to examine whether § 112, P6 applies). The claim recites "securing means," which gives rise to the presumption that § 112, P6 applies. *See id.* The function is "to cause said rod to bear against said channel through the application of substantially equal compressive forces by said securing means in the direction of the vertical ax is and applied on either side along said longitudinal axis of said channel."

'555 patent, col. 8, ll. 53-57.

"Either side" does not refer to "either side" of the rod on the vertical axis of the channel perpendicular to the rod, because that interpretation would render the "in the direction of the vertical axis" language redundant. The "and" in the phrase "in the direction of the vertical axis and applied on either side" makes that clear. Therefore, the function is to cause the rod to bear against the rod-receiving channel by applying a compressive [\*34] force in the direction of the vertical axis while ensuring that substantially equal forces are applied along the longitudinal axis of the rod on opposite sides--either inside or outside--of the rod-receiving channel.

We must now determine whether the claim recites structure to carry out that function. The claim states that the "securing means ...cooperate with each of said anchor seat portions," *id.*, ll. 44-45, in that the "securing means includes second threads which cooperate with the first threads of the seat means to cause [the [\*1308] desired function]," *id.*, ll. 51-57. Although it is the operation of the threads that causes the rod to bear against the channel by applying a compressive force in the direction of the vertical axis, a naked incantation of threads alone does not ensure that substantially equal forces are applied along the longitudinal axis of the rod on opposite sides of the rod-receiving channel. Because there is insufficient structure recited for performing the specified function, §

*112, P6 applies. Thus, we construe the claim "to cover the corresponding structure ...described in the specification and equivalents thereof."*

The structure for performing the recited [\*\*35] function is described as follows:

The nut 27 includes internal threads 83 which engage the external threaded area 76 on the anchor seat. The nut 27 is a hex nut which can be tightened relative to the seat 25.

As the nut 27 is rotated about the anchor seat 25, it cooperates with the top side of the flange 46,47 to tighten on the clamp 25 in relation to the rod support 23. The rod 18 is grasped in the tunnel 84 formed between the rod-receiving channel 54 of the anchor seat 23 and the arch 72 of the cap 25.

The threads 76 on the anchor seat 23 extend downwardly on the seat below the top of the cylindrical surface of the rod 18 as is shown in FIG. 2 and the nut 27 has a relatively constant diameter through the bore as is shown in FIGS. 2 and 4. Accordingly, the nut 27 can be screwed directly onto the anchor seat 23 to compressively hold the rod without the cap 25.

'555 patent, col. 6, ll. 9-24. Figures 5 and 7 depict the rod 18 in the channel created by the anchor seat 23, with the nut 27 securing the rod in place. Thus, the structure that corresponds to the claimed function is a nut with internal threads cooperating with the external threads of the anchor seat (an "external [\*\*36] nut"). The claim covers that structure and equivalents thereof.

We are not persuaded by Medtronic's argument that the written description shows a disavowal of equivalents. Although we need not decide that there can never be a disavowal of § 112, P6 equivalents, "§ 6 112-was written precisely to avoid a holding that a means-plus-function limitation must be read as covering only the means disclosed in the specification." *D.M.I., Inc. v. Deere & Co.*, 755 F.2d 1570, 1574 (Fed. Cir. 1985). In this case, the inventors were merely describing the structure that performs the claimed function.

Nor are we persuaded that the prosecution history shows a disavowal. In an August 4, 1994 Office Action ("Office Action"), the Examiner rejected the apparatus claims, in part, under § 112, P1, because "the specification failed to provide an enabling description of the embodiment of the action device excluding the cap/cap means," and because "language directed toward the 'securing means' cooperating with the seat means through application of compressive forces by the securing means" failed to have support in the specification. *Office Action* at 4. Subsequent to that rejection, [\*\*37] an interview was held with the Examiner and the Examiner Interview Summary referred to "securing means" as "i.e., the nut." In addition, Remarks in the April 27, 1995 Amendment ("Amendment") stated that Applicant amended the claims "to define the anchor seat means having a channel and threads which cooperate with the securing means (i.e., the nut) so as to capture the stabilizer between the channel and the securing means." *Amendment* at 4. However, Applicant did not add language in claim 5 that limited securing means to a nut. The statements referring to "securing means" as "i.e., the nut" simply help to provide the requisite [\*\*38] linkage between the function recited in the claim and the "corresponding" structure. See *Default Proof Credit Card Sys., Inc. v. Home Depot U.S.A., Inc.*, 412 F.3d 1291, 1298 (Fed. Cir. 2005) ("A structure disclosed in the specification qualifies as "corresponding" structure only if the specification or prosecution history clearly links or associates that structure to the function recited in the claim."). Applicant did not disclaim all structural equivalents.

Therefore, the district court correctly construed the "securing means" limitation [\*\*39] to refer to the external nut described in the written description. Under § 112, P6, the claim also covers equivalents thereof.

#### 4. "bear against said channel"

The parties dispute whether the language of claim 5 reciting that the "rod ...bears against said channel" precludes the presence of any intervening structure between the rod and the channel. The district court held that "there is nothing in the [language of claim 5] which excludes an anchor channel composed of more than one component part." *Infringement Opinion 2004 U.S. Dist. LEXIS 14183*, [WLJ at 8]. Medtronic argues that the district court's construction is erroneous, and that by placing a separable crown member over the anchor seat,

Medtronic has prevented the rod from "bearing against [the] channel" as a matter of law. Medtronic asserts that the anchor seat must form the channel and the crown is not part of the anchor seat. Cross Medical responds that claim 5 does not require that the channel of the anchor seat be a unitary component and thus does not preclude a finding that the crown is part of the anchor seat.

The dispute reduces to whether the "channel" must be formed in a unitary structure. The claim requires that the anchor seat means have [\*\*39] "an anchor seat portion spaced apart from said bone interface including a channel to receive said rod," '555 patent, col. 8, ll. 41-42, and that the "securing means ...causes said rod to bear against said channel," *id.*, ll. 51-54. The claim does not state that the anchor seat portion forming the channel is unitary. Although the sole embodiment described in the specification depicts a unitary structure, *id.*, col. 5, ll. 20-21, the mere depiction of a structural claim feature as unitary in an embodiment, without more, does not mandate that the structural limitation be unitary. See *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1367 (Fed. Cir. 2002) (holding that "member" encompassed a multi-component structure where the preferred embodiment showed a single-component structure, but the specification did not otherwise require a certain number of components). There is nothing in the written description or prosecution history that limits the channel to being formed in a single-component structure. Thus, the district court correctly concluded that the "bear against said channel" language of claim 5 does not exclude an "anchor seat portion" composed of multiple [\*\*40] components.

#### D. Infringement

The district court ruled as a matter of law that the accused devices met the "operatively joined," "securing means," and "bear against said channel" limitations, that Medtronic was a direct infringer, and that alternatively, Medtronic either contributed to infringement or induced infringement. *Infringement Opinion*, 2004 U.S. Dist. LEXIS 14183, [WL] at 4-9. Medtronic appeals.

##### 1. "operatively joined"

The district court held that the accused devices met the "operatively joined" limitation as a matter of law because "the accused device, to be infringing, need only be capable of operating in the [infringing] mode ...actual [infringing] operation in the accused device is not "

required. 2004 U.S. Dist. LEXIS 14183, [WL] at 5-6 [\*1310] (quoting *Intel Corp. v. U.S. Int'l Trade Comm'n*, 946 F.2d 821, 832 (Fed. Cir. 1991)). The district court cited *Hilgraeve Corp. v. Symantec Corp.*, 265 F.3d 1336, 1343 (Fed. Cir. 2001), for the proposition that "an accused device may be found to infringe if it is reasonably capable of satisfying the claim limitations, even though it may also be capable of non-infringing modes of operation." *Infringement Opinion*, 2004 U.S. Dist. LEXIS 14183, [WL] at 5. The court explained that [\*\*41] Medtronic's devices "are capable of operative joinder to the bone segment, and are sometimes used in this way." 2004 U.S. Dist. LEXIS 14183, [WL] at 5-6. In response to Medtronic's argument that it could not directly infringe because it did not perform surgery, the district court held that "under 35 U.S.C. § 271 Defendants can be liable for inducing the infringement or for selling a device which constitutes part of the invention." 2004 U.S. Dist. LEXIS 14183, [WL] at 8.

Medtronic argues that it does not itself make an anchor seat which contacts bone and it does not perform surgery. Medtronic asserts that *Intel* and *Hilgraeve* are inapposite and that it cannot be a direct infringer simply because its accused devices are capable of being made into infringing devices by surgeons. Medtronic adds that it does not induce or contribute to infringement because there is no evidence of physicians bringing the receiver member into contact with the bone segment to make the claimed apparatus; because Medtronic does not design the receiver member to contact the bone segment; and because Medtronic instructs surgeons not to place the device into contact with the bone.

Cross Medical counters that to directly infringe, [\*\*42] Medtronic need only make devices that are capable of being converted into infringing devices, citing *Intel*, *Hilgraeve*, and *Bell Communications Research v. Vitalink Communications Corp.*, 55 F.3d 615 (Fed. Cir. 1995). Cross Medical asserts that Medtronic's argument that it does not directly infringe because it does not perform surgery is as superficial as the non-infringement argument concerning the "Commissioner.com" product in *Fantasy Sports Props., Inc. v. SportsLine.com, Inc.*, 287 F.3d 1108 (Fed. Cir. 2002), and therefore must fail. Furthermore, Cross Medical argues that Medtronic's representatives are present in the operating room and thus that Medtronic performs surgery. Alternatively, Cross Medical argues that Medtronic induces infringement because it sells devices to surgeons, designs its anchors to

function when in contact with bone, and intends that surgeons bring the anchor seat into contact with bone; and because surgeons actually bring the anchor seat into contact with bone. Cross Medical asserts that Medtronic is a contributory infringer because it has not proven that there are substantial non-infringing uses.

"Whoever without authorization [\*\*43] makes, uses, offers to sell, or sells any patented invention, within the United States or imports into the United States any patented invention during the term of the patent therefor [directly] infringes the patent." 35 U.S.C. § 271(a) (2000). To prove direct infringement, the plaintiff must establish by a preponderance of the evidence that one or more claims of the patent read on the accused device literally or under the doctrine of equivalents. *Advanced Cardiovascular Sys., Inc. v. SciMed Life Sys., Inc.*, 261 F.3d 1329, 1336 (Fed. Cir. 2001). "Literal infringement requires that each and every limitation set forth in a claim appear in an accused product." *Frank's Casing Crew & Rental Tools, Inc. v. Weatherford Int'l, Inc.*, 389 F.3d 1370, 1378 (Fed. Cir. 2004) (internal citation omitted). Claim 5 of the '555 patent is an apparatus claim. See '555 patent, col. 8, ll. 34-57. We held in Part II. 2 C. *supra* that the "operatively joined" limitation requires that "the interface and the [\*1311] bone segment are connected and in contact such that the device is effective to perform posterior stabilization."

In support of its argument [\*\*44] that Medtronic directly infringes, Cross Medical cites evidence that Medtronic's representatives appear in the operating room, identify instruments used by surgeons, and thus in effect "join" the anchor seat to the bone. Cross Medical argues that the situation is analogous to those in which courts have found a party to directly infringe a method claim when a step of the claim is performed at the direction of, but not by, that party. See, e.g., *Shields v. Halliburton Co.*, 493 F. Supp. 1376, 1389 (W.D. La. 1980). However, if anyone makes the claimed apparatus, it is the surgeons, who are, as far as we can tell, not agents of Medtronic. Because Medtronic does not itself make an apparatus with the "interface" portion in contact with bone, Medtronic does not directly infringe.

Nor does *Intel* support a finding of direct infringement. The claim at issue in *Intel* called for a "programmable selection means" and thus required only that an accused device be capable of operating in the enumerated mode. 946 F.2d at 832; see *Fantasy Sports*,

287 F.3d at 1117-18; *High Tech Med. Instrumentation Inc. v. New Image Indus., Inc.*, 49 F.3d 1551, 1555-56 (Fed. Cir. 1995). [\*\*45] Here, the claim does not require that the interface be merely "capable" of contacting bone; the claim has a structural limitation that the anchor seat be in contact with bone. See *Fantasy Sports*, 287 F.3d at 1117-18 (stressing the "programmable" language of the claim at issue in *Intel* and holding that *Intel* "does not stand for the proposition ...that infringement may be based upon a finding that an accused product is merely capable of being modified in a manner that infringes the claims of a patent"); *High Tech*, 49 F.3d at 1555-56 (distinguishing *Intel* based on the permissive language of the claim at issue). Cross Medical would distinguish *High Tech* by asserting that the device in that case had to be physically altered to become infringing, while Medtronic's device need not be altered. However, Cross Medical again fails to recognize that the limitation--the anchor seat being in contact with bone--is absent until the screw and anchor are put in place during surgery.

*Bell Communications* and *Hilgraeve* are also inapposite. In *Bell Communications*, plaintiff asserted that defendant's product embodied a claimed method, but the [\*\*46] district court granted summary judgment of non-infringement reasoning that the product had non-infringing modes of operation. 55 F.3d at 618-19. In *Hilgraeve*, plaintiff asserted that defendant sold software that, when in operation, infringed plaintiff's method claim, but the district court granted summary judgment of non-infringement based on rationale similar to that in *Bell Communications*. See *Hilgraeve*, 265 F.3d at 1339-40. In both cases on appeal, this court held that the district court had erred by overlooking the rule that "an accused product that sometimes, but not always, embodies a claimed method nonetheless infringes." *Bell*, 55 F.3d at 622-23; accord *Hilgraeve*, 265 F.3d at 1343 ("So too the sale of a device may induce infringement of a method claim even if the accused device is capable of non-infringing modes of operation in unusual circumstances."). However, a rule that governs infringement of a method claim may not always govern infringement of an apparatus claim. See, e.g., *NTP, Inc. v. Research in Motion, Ltd.*, 418 F.3d 1282, 2005 U.S. App. LEXIS 15920 (Fed. Cir. 2005) (distinguishing between method [\*\*47] claims and apparatus claims for the purpose of determining infringement under section 271(a)). To infringe an apparatus claim, the device [\*1312] must meet all of the structural limitations. See *Hewlett-Packard Co. v. Bausch & Lomb, Inc.*, 909 F.2d

*1464, 1468 (Fed. Cir. 1990)* ("Apparatus claims cover what a device *is*, not what a device *does*."); *In re Michlin*, 45 C.C.P.A. 1028, 256 F.2d 317, 320, 1958 Dec. Comm'r Pat. 408 (C.C.P.A. 1958) ("It is well settled that patentability of apparatus claims must depend upon structural limitations and not upon statements of function."). In this case, claim 5 is an apparatus claim which contains the structural limitation that the anchor seat contact bone. Cross Medical has not proven that Medtronic makes an apparatus with an anchor seat in contact with bone.

Cross Medical's reliance on *Fantasy Sports* is also misplaced. In *Fantasy Sports*, the apparatus claim called for "[a] computer for playing football." 287 F.3d at 1111. The district court found that the accused "Commissioner.com" product did not infringe because it was a "modifiable software tool," not a computer for playing football. *See id.* at 1118. [\*\*48] We disagreed, holding that Sportsline directly infringed by making or using the apparatus because no reasonable juror could find that the "Commissioner.com" product was not software installed on a computer. *See id.* at 1118-19. Cross Medical argues that the theory that Medtronic does not directly infringe because it does not itself contact the anchor seat to the bone is as superficial as Sportsline's theory that its product was software but not a computer. However, unlike in *Fantasy Sports*, in this case, no reasonable juror could find that the accused infringer itself makes or uses the entire claimed apparatus. The anchor seat of the device does not contact bone until the surgeon implants it.

Because Medtronic is not a direct infringer, we next consider whether Medtronic induces or contributes to infringement. Under § 271(b), "whoever actively induces infringement of a patent shall be liable as an infringer." 35 U.S.C. § 271(b). "In order to succeed on a claim of inducement, the patentee must show, first that there has been direct 'infringement, and 'second, that the alleged infringer knowingly induced infringement and possessed specific [\*\*49] intent to encourage another's'" infringement. *MEMC Elec. Materials, Inc. v. Mitsubishi Materials Silicon Corp.*, 420 F.3d 1369, 1378 (Fed Cir. 2005) (quoting *Minn. Mining & Mfg. Co. v. Chemque, Inc.*, 303 F.3d 1294, 1304-05 (Fed. Cir. 2002)). Under § 271(c), "whoever offers to sell or sells within the United States ...a component of a patented machine, manufacture, combination or composition ...constituting a material part of the invention, knowing the same to be

especially made or especially adapted for use in an infringement of such patent, and not a staple article or commodity of commerce suitable for substantial noninfringing use, shall be liable as a contributory infringer." 35 U.S.C. § 271(b). In order to succeed on a claim of contributory infringement, in addition to proving an act of direct infringement, plaintiff must show that defendant "knew that the combination for which its components were especially made was both patented and infringing" and that defendant's components have "no substantial non-infringing uses." *Golden Blount, Inc. v. Robert H. Peterson Co.*, 365 F.3d 1054, 1061 (Fed. Cir. 2004) [\*\*50] (internal quotations omitted).

As to the predicate act of direct infringement, we conclude that there is a genuine issue of material fact as to whether surgeons infringe by making the claimed apparatus. The only evidence that Cross Medical cites suggesting that the anchor seat contacts bone is the statement of Medtronic's employee, Michael Sherman, during his January 29, 2004 deposition:

[\*1313] Q. How far down do you screw the screw initially?

A. Well, it depends. Because if you screw these screws all the way down, they stop rotating. And the rotating around the ball is a feature of the screw. So you lose some of your ability to rotate, or your freedom.

Because the reason these screws have multiple angles is to make it easier to assemble the system in the patient. So if you screw these things down super-tight, you may have--you know, you've eliminated the multiaxial capability of the screw.

So the surgeon in his judgment gets it down, and I like to tell them, as far as they feel comfortable doing and still have some rotation. Because the further in the instrumentation is into the patient, the lower - the closer the instrumentation is to the loads, and thus the lower the bending [\*\*51] moments are on the instrumentation and the less likelihood of metal failure.

Q. In practice, in some instances the screw is screwed down such that the receiver touches the bone; is that right?

A. I'm sure some surgeons do that. And it can touch the bone and still move a little because the bone is elastic. And the tissue right on top of the bone isn't necessarily bone. It's periosteum. It's deformable.

Medtronic counters with an April 22, 2004, declaration from Kevin Foley, M.D., a board certified neurosurgeon, who has performed over 500 operations using Medtronic's allegedly infringing products. Dr. Foley states, in pertinent part, that:

in all of the surgeries I perform using Medtronic Products, I try to minimize or avoid contact of any part of the receiver member to the patient's spinal anatomy to ease the eventual implantation of the rod. I do not count on any type of direct connection between the receiver member and the patient's spine to impart any stability to the spine or to the implant construct. . . .

When implanting the Medtronic Products in a patient's spine, any contact between the receiver member and any portion of the patient's anatomy is incidental to [\*52] the surgery and not intended to impart any stability to the spine. In fact, when I instruct other spine surgeons in how to implant the Medtronic Products, I tell them that if they tighten down on the bone screw enough to bring the receiver member into engagement with the spine, they should back off the bone screw by one-quarter to one-half turn so as to better enable alignment of the receiver members with the rod.

Thus, Sherman—who is not testifying that he witnessed contact—speculates that some surgeons may bring the receiver member into contact with bone. Dr. Foley confirms that from time to time, "incidental to the surgery," the receiver member comes into contact with bone. However, Dr. Foley also suggests that he "tries to

minimize or avoid contact" and instructs others to "back off the bone screw by one quarter to one-half turn" "if they tighten down on the bone screw enough to bring the receiver member into engagement with the spine."

On the one hand, drawing inferences in favor of Medtronic, a reasonable juror could conclude that the apparatus is not made because, more likely than not, there is no contact between the receiver member and the bone. On the other hand, drawing [\*\*53] inferences in favor of Cross Medical, a reasonable juror could conclude that the apparatus is made by surgeons. Sherman's statements suggest that the device is capable of posterior stabilization when the receiver member contacts bone, and the statements of both Sherman and Dr. Foley suggest that there may be some [\*1314] contact between the receiver member and the spine. We leave it to the fact finder to decide whether surgeons directly infringe.

As to inducement, there is a genuine issue of material fact both as to whether Medtronic "knowingly induced infringement" and as to whether Medtronic "possessed specific intent to encourage [the surgeons'] infringement." On the one hand, in the record are Medtronic's "Field Bulletins" instructing surgeons that the proper technique for installation of the Medtronic device is with the receiver member not in contact with the bone. Medtronic asserts that these materials, together with Dr. Foley's statement, show that it had no knowledge that the surgeons made the claimed apparatus and that it had no specific intent to encourage infringement. On the other hand, Cross Medical points to Sherman's statements—that he would instruct surgeons to screw the [\*\*54] receiver member down "as far as they feel comfortable doing and still have some rotation" and that "[the receiver member] can touch the bone and still move a little because the bone is elastic"—as evidence that Medtronic anticipated that surgeons would contact bone and intended that the device function when in contact with bone. Drawing inferences in favor of Medtronic, a reasonable juror could find that Medtronic did not know that surgeons make the claimed apparatus and, moreover, did not specifically intend for surgeons to contact bone with the anchor seat. Drawing inferences in favor of Cross Medical, a reasonable juror could find that Medtronic designed its device to function when the anchor seat contacted bone, anticipated that surgeons would contact the anchor seat to bone, and thus intended for the surgeon to make or use the apparatus as claimed.

As to contributory infringement, there is a genuine issue of material fact as to whether there are substantial non-infringing uses of Medtronic's devices, specifically, uses of the devices with no receiver member-to-bone contact. Drawing inferences in favor of Medtronic, a reasonable juror could conclude, based on Dr. Foley's statements, [\*\*55] that a substantial number of surgeries occur in which the claimed apparatus is not made or used, as surgeons are able to avoid contact between the seat and bone. Drawing inferences in favor of Cross Medical, a reasonable juror might also conclude that in almost every surgery, the claimed apparatus is made or used, as some contact between the receiver member and the bone is incidental.

Therefore, the district court erred in ruling both that there were no genuine issues of material fact as to infringement and that Medtronic infringed as a matter of law.

## 2. "securing means"

The district court ruled that Medtronic's "set screw" is equivalent to the external nut as a matter of law because it performs compression in "substantially the same way" to achieve "substantially the same result" as the "external nut." *Infringement Opinion*, 2004 U.S. Dist. LEXIS 14183, [WLJ] at 6. The district court cited testimony that the set screw has opposite points of contact on the rod 180 degrees apart, noted that the screw is intended to be coaxial with the anchor means, and explained that "although Plaintiff does not provide tests showing the magnitude of the force on either side, everything before the Court supports the conclusion [\*\*56] the forces are substantially equal." 2004 U.S. Dist. LEXIS 14183, [WLJ] at 7. The district court added that "defendants submitted no evidence to show the forces are not equal." *Id.* The district court reasoned: "viewing the devices themselves and the testimony, it appears Defendants' inner screw meets the limitation applying [\*1315] substantially equal compressive forces on either side of the channel." *Id.*

Medtronic argues that a set screw is not equivalent to an external nut as a matter of law, citing *Chiuminatta Concrete Concepts Inc. v. Cardinal Industries, Inc.*, 145 F.3d 1303 (Fed. Cir. 1998). Medtronic notes that the '555 patent's express reference to the use of a set screw to attach a cross-link to the rod, but lack of a reference to a set screw to lock the rod to the anchor seat, is compelling evidence of non-equivalents. In addition, Medtronic

asserts that set screws and external nuts are not interchangeable because set screws apply a "splaying" force to the side walls of the anchor seat while external nuts do not; an external nut applies compressive forces to the rod in a way that bows or bends the rod upwardly in the anchor seat channel while the set screw minimizes this type of load [\*\*57] on the rod; and bowing creates a problem in Medtronic's devices. Medtronic adds that Dr. Puno, an inventor of the '555 patent, testified that a set screw and an external nut were not interchangeable. Medtronic portrays as unsupported the views of Dr. Villarraga, Cross Medical's ex pert, who opined that the set screw and external nut are interchangeable. Medtronic argues that Cross Medical has offered no evidence that the set screw applies "substantially equal compressive forces" to the rod; and asserts that Michael Sherman offered convincing testimony that they do not. Medtronic asserts that at the least, there is a genuine issue of material fact as to whether the set screw is an equivalent.

Cross Medical argues that a set screw and external nut perform the function of compression in substantially the same way--applying a downward force on a rod achieved by engaging threads of the receiver--to achieve the identical result--securing the rod in the channel; and that *Chiuminatta* is distinguishable. Cross Medical cites evidence that the set screw applies force to opposite sides of the channel. Cross Medical asserts that, because the compression being applied from the set screw to [\*\*58] the rod would be through absolutely equal forces applied on either side of the channel absent machining imperfections and patient physiology, if one were to account for these factors, the forces would be substantially equal. Cross Medical argues that "splaying" and "bowing" do not affect equivalents and that Dr. Villarraga's opinion on interchangeability is properly based on her knowledge of mechanical engineering and her examination of the devices. Cross Medical asserts that Dr. Puno's testimony on interchangeability is irrelevant. Cross Medical argues that Medtronic admitted in U.S. Patent No. 6,660,004 ("the '004 patent") that the set screw and external nut were interchangeable. Cross Medical additionally asserts that because Medtronic argued that a set screw and external nut are equivalent to invalidate claims of another patent, Medtronic is estopped from asserting that they are not equivalent.

"Literal infringement of a § 112, P6 limitation requires that the relevant structure in the accused device perform the identical function recited in the claim and be

identical or equivalent to the corresponding structure in the " specification. *Frank's Casing*, 389 F.3d at 1378 [\*\*59] (quoting *Odetics, Inc. v. Storage Tech. Corp.*, 185 F.3d 1259, 1267 (Fed. Cir. 1999)). "Because structural equivalents under § 112, P6 are included within literal infringement of means-plus-function claims, 'the court must compare the accused structure with the disclosed structure, and must find equivalent structure as well as identity of claimed function for the structure. '" *Id.* (quoting *Pennwalt Corp. v. Durand-Wayland, Inc.*, 833 F.2d 931, 934 (Fed. Cir. 1987) (en banc) (emphasis omitted)). "This inquiry for equivalent structure under [\*1316] § 112, P6 examines whether 'the assertedly equivalent structure performs the claimed function in substantially the same way to achieve substantially the same result ....'" *Id.* (quoting *Odetics*, 185 F.3d at 1267).

At the outset, we conclude that Medtronic is not estopped from challenging interchangeability. In this case, Medtronic argued that a set screw and external nut are functionally equivalent for purposes of validating claim 10 of the '237 patent. However, that argument has no bearing on Medtronic's challenge to the interchangeability of a set screw and an external nut with respect [\*\*60] to claim 5 of the '555 patent because the functions of the "securing means" in claim 5 of the '555 patent and claim 10 of the '237 patent are different. Claim 10 does not require the application of substantially equal compressive forces to the rod on either side of the channel. See '237 patent, col. 4, ll. 42-58, ll. 61-63; col. 5, ll. 14-22. Because the positions are not entirely inconsistent, judicial estoppel does not apply. See *Interactive Gift Express, Inc. v. Compuserve Inc.*, 256 F.3d 1323, 1345 (Fed. Cir. 2001) ("[A] party will be judicially estopped from asserting a position on appeal that is directly opposed to a position that the party successfully urged at trial." (internal citations omitted)).

As to the merits, the claimed function has two parts: (1) causing the rod to bear against the channel by applying a compressive force in the direction of the vertical axis; and (2) ensuring that substantially equal forces are applied along the longitudinal axis of the rod on opposite sides--either inside or outside--of the rod-receiving channel. There is no dispute that the set screw applies a compressive force in the direction of the vertical axis. However, [\*\*61] there is a genuine issue of material fact as to whether the set screw applies substantially equal forces on opposite sides of the channel, and thus whether there is identity of function.

On the one hand, Cross Medical cites testimony stating that the v-ring on the bottom of the internal set screws creates two points of contact when the set screws are compressed against the rod; that the two points of contact between the set screw and the rod are 180 degrees apart, separated by the drive in the set screw; and that the set screw is intended to be co-axial with the receiver (but because of manufacturing tolerances is not co-axial). (Sherman Dep. of Jan. 29, 2004, at 137-41; Sherman Dep. of Jan. 30, 2004, at 283-84.) On the other hand, Medtronic cites testimony stating that Sherman did not know if the load on the points of contact on either side of the v-ring were equal; that when the implant is functioning in a patient, the screw takes on additional load from the rod; and that anytime the screw is loaded, load will increase on one side of the plug such that forces on the two sides would be unequal. (*Id.* at 365-66.) Sherman further testified that he did not know if forces would be [\*\*62] equal before the screw and anchor seat were implanted, because manufacturing tolerances might impact the forces. (*Id.* at 366-67.) Drawing inferences in favor of Medtronic, a reasonable juror could find that the forces are not substantially equal on each side of the channel because of manufacturing tolerances and the additional load placed on the screw by the rod when implanted. Crediting Cross Medical's evidence, a reasonable juror could draw an inference based on Sherman's testimony that the forces applied to the rod on either side of the channel are substantially equal.

Moreover, there is a genuine issue of material fact as to whether the set screw accomplishes the claimed function in substantially the same way as the external nut. Medtronic has cited the testimony of [\*1317] Dr. Puno stating that he considered using a set screw in 1990 to hold the rod in place but decided against the set screw because of splaying concerns. (Puno Dep. of April 9, 2004, at 32, l. 10-36, l. 24.) Dr. Puno stated that having the side walls of the anchor seat spread apart when the screw was tightened down would be "a bad thing" and "could end up loosening the connection on the rod." (*Id.* at 35, ll. 7-14.) [\*\*63] Although Dr. Puno testified that he thought a set screw and external nut were interchangeable, he qualified his statement when confronted with prior deposition testimony to the opposite effect. (*Id.* at 37, l. 3--41, l. 23.) Dr. Villarraga stated that the structures were interchangeable because they both could compress a rod into a channel, and because other polyaxial devices utilized set screws. (Villarraga Decl. of April 12, 2004, at 2.) However, Dr.

Villarraga neither explained with any specificity why one of ordinary skill in the art at the time the '555 patent issued would believe the structures to be interchangeable, nor did she refer to any testing. (*See id.*) Drawing inferences in favor of Medtronic, a reasonable juror could find that the set screw does not compress the rod in substantially the same way based on Dr. Puno's testimony about the potential for splaying and his conscious decision to avoid the set-screw design. Drawing inferences in favor of Cross Medical, a reasonable juror could find that the set screw compresses the rod in substantially the same way because both employ threads as a compression mechanism, and some statements of Drs. Puno and Villarraga support [\*\*64] a finding of interchangeability.

We thus disagree with Medtronic that the equivalents question should be removed from the trier of fact under *Chiuminatta*. In that case, we held that no reasonable juror could conclude that the differences between "soft round wheels" and a "skid plate" were insubstantial. *Chiuminatta*, 145 F.3d at 1310. One of the many reasons that we found no equivalents as a matter of law was that the patent at issue discussed the use of wheels for another function, but never disclosed that wheels could perform the same function as the skid plate. *Id.* In this case, although Medtronic may argue that the fact finder should draw an inference of no interchangeability based on the inventors' explicit reference to set screws to form a cross-link, *see '555 patent*, col. 6, ll. 25-44, and their failure to explicitly recognize set screws as a means for securing the anchor to the bone, we must draw inferences in favor of Cross Medical in evaluating Medtronic's cross-motion for summary judgment. As discussed *supra*, we believe that the issue of interchangeability should be left for the trier of fact.

We also reject the other arguments that both [\*\*65] sides make in attempting to prevail on equivalents as a matter of law. First, we reject Cross Medical's argument that the '004 patent serves as an admission on interchangeability. Even though the '004 patent, which is assigned to an entity related to Medtronic, suggests that an "internally-threaded nut" is interchangeable with "a set screw or internal plug," '004 patent, col. 8, ll. 10-32, that patent issued in 2003 and is irrelevant to known interchangeability in 1995, when the '555 patent issued. *See Al-Site*, 174 F.3d at 1320 ("[A] structural equivalent under § 112 must have been available at the time of the issuance of the claim."). Second, we reject Medtronic's

contentions that the lack of "bowing" with the set screw and the evidence that the external nut does not function to cause "bowing" in Medtronic's device are relevant to interchangeability. Even if the external nut causes "bowing" in Medtronic's device, it is immaterial to the equivalents analysis because "prevention of bowing" is not a limitation of claim 5. *See Micro Chem.*, 194 F.3d at 1258 [\*1318] (cautioning against adopting a function different from that explicitly recited in the claim). [\*\*66] Furthermore, although Medtronic argues that the external nut may not work well in Medtronic's products, any impact this might have on the interchangeability analysis is undercut by a lack of evidentiary support.

In summary, we conclude that there is a genuine issue of material fact with respect to whether a set screw is equivalent to an external nut. Thus, the district court erred in deciding equivalents as a matter of law.

### 3. "bear against said channel"

Relying on its holding that the channel of the anchor seat could comprise more than one component, the district court ruled that, even if the crown is free-floating and not physically joined to the anchor seat because there is no lock between the crown and the screw, Medtronic's devices met the "bear against said channel" limitation as a matter of law. *Infringement Opinion*, 2004 U.S. Dist. LEXIS 14183, [WLJ] at 7-8. The district court considered evidence that the crown member is physically joined to the anchor seat because it cannot be removed without breaking the screw. *Id.* The district court analogized the crown in Medtronic's devices to a "pressure disk"--which was physically between the rod and the anchor seat--that the district court previously had [\*\*67] held met the "bear against the channel" limitation in *Cross Med. Prods. v. Depuy Acromed, Inc.*, 2002 U.S. Dist. LEXIS 27884, No. SA CV 00-876-GLT (ANx), (C.D. Cal. Feb. 11, 2002). *Infringement Opinion* at 7.

Medtronic argues that even if the anchor seat can be comprised of multiple components, as a matter of fact, the crown member in its accused devices is not part of the channel formed by the anchor seat and, thus, the rod does not bear against the channel as recited in the claim. Medtronic asserts that the crown is free floating and not physically or otherwise joined to the receiver; that the crown is either screwed or slid into the receiver; and that the crown is retained either by a snap ring or by interrupting the threads on the receiver after the crown is screwed into the receiver. Medtronic adds that the

presence of the crown between the rod and the bone screw causes the receiver member to become rigidly locked to the screw, which serves a different function than a channel absent a crown member.

Cross Medical counters that there is nothing to preclude a finding that the crown is part of the anchor seat. Cross Medical argues that the crown member is part of the channel formed by the anchor [\*\*68] seat because the crown is assembled into the device before it is sold, and cannot be removed without damaging the device. Cross Medical asserts that the crown is physically joined to the receiver, and adds that any difference in function is irrelevant because claim 5 has no functional limitation.

There is a genuine issue of material fact as to whether the "bear against [the] channel" limitation is met by the accused products. Sherman testified that in one product, "the crown member is threaded and screws down into the receiver member until it passes the threads of the receiver member and then floats freely until locked down by the rod." (Sherman Decl. of April 23, 2004, at 3.) Sherman stated that in other products, "the crown member is maintained in the receiver member by a snap ring that is designed to allow the crown 'member' to float or move freely within a limited range" before being locked down by the rod. (*Id.*) Sherman added that the rod touches only the crown member in each of Medtronic's products. (*Id.* at 3-4.) Viewing this evidence in the light most favorable to Medtronic, a reasonable juror could conclude that the rod bears only against the crown member, [\*1319] which [\*\*69] is separate from the channel in the anchor seat, and thus the rod does not "bear against" the channel of the anchor seat.

However, a reasonable juror could also find that the crown member is a part of the channel, and thus that the rod bears against the channel. Cross Medical cites to evidence that the screw, crown, snap ring, and receiver are assembled as one unit before the implant arrives to the surgeon. (Sherman Dep. of Jan. 29, 2004, at 123.) Cross Medical also cites evidence that the snap ring, which holds the crown member loosely in place, is damaged if the implant is disassembled. (*Id.* at 247.) And we agree with Cross Medical that the function served by the crown member is irrelevant to finding that this structural limitation is met. See *Amstar Corp. v. Envirotech Corp.*, 730 F.2d 1476, 1482 (Fed. Cir. 1984) ("Modifications by mere addition of elements of function ...cannot negate infringement ....").

Because there is a genuine issue of material fact as to whether the "bear against [the] channel" limitation is met, the district court erred in ruling that the accused devices met this limitation as a matter of law.

#### E. Invalidity

The district court [\*\*70] granted Cross Medical's cross-motion for partial summary judgment on all invalidity defenses raised by Medtronic with respect to claim 5 of the '555 patent, including indefiniteness, anticipation, and obviousness. Medtronic appeals each of these rulings.

##### 1. Indefiniteness

As noted in Part II. C. 3 *supra*, Medtronic argued that the district court erroneously interpreted the function of the "securing means" to require that equal forces be applied along the longitudinal axis of the channel on "either side" of the vertical axis. Medtronic asserted that the district court's interpretation would leave "said longitudinal axis" without a sufficient antecedent basis and render claim 5 indefinite. We construed the function of the "securing means" limitation as "to cause the rod to bear against the rod-receiving channel by applying a compressive force in the direction of the vertical axis, while ensuring that substantially equal forces are applied along the longitudinal axis of the rod on opposite sides--either inside or out side--of the rod-receiving channel." We agreed with Medtronic that the antecedent basis for "said longitudinal axis" was by implication the longitudinal axis of the [\*\*71] rod. See *Slimfold Mfg. Co. v. Kinkead Indus., Inc.*, 810 F.2d 1113, 1116 (Fed. Cir. 1987) (noting that an antecedent basis can be present by implication). Because the "said longitudinal axis" limitation is not lacking in antecedent basis, we conclude that the district court did not err in granting Cross Medical's motion for summary judgment that claim 5 is not indefinite.

##### 2. Anticipation

The district court held that claim 5 was not anticipated as a matter of law because claim 5 covers only polyaxial screws and the two prior art references asserted to be anticipating--U.S. Patent No. 4,763,644 to Webb ("the '644 patent") and the "Bryd-Transpedicular Spinal Fixator"--disclose only monoaxial screws. *Invalidity Opinion*, 2004 U.S. Dist. LEXIS 27644, [WL] at 5. Medtronic's arguments on anticipation turn entirely

upon whether claim 5 covers monoaxial screws. Because we determined in Part II. C. 1 *supra* that claim 5 does not cover monoaxial screws, we conclude that the district court did not err in granting Cross Medical's motion for partial summary judgment that claim 5 is not anticipated.

### 3. Obviousness

In the district court, Medtronic contended that claim 5 was obvious in view of the '602 patent, [\*\*72] the '644 patent, and the [\*1320] Byrd device. *Invalidity Opinion*, 2004 U.S. Dist. LEXIS 27644, [WLJ] at 6. The parties agreed that the '602 and '644 patents were prior art, but the district court held that because Dr. Puno, an inventor on the '555 patent, also invented the closure mechanism of the Bryd device, the Bryd device was not prior art. 2004 U.S. Dist. LEXIS 27644, [WLJ] at 6. Focusing on the '602 and '644 patents, the district court explained that the '602 patent and the '555 patent are both polyaxial spinal implant devices. *Id.* The district court noted that "the only major difference between the '602 patent and the '555 is the '602 device is tightened from the bottom and the '555 is a top-loading nut," but that "the '644 patent covers a top-loading monoaxial spinal implant device." 2004 U.S. Dist. LEXIS 27644, [WLJ] at 7. However, the district court held that there was no motivation to combine the '602 and '644 references, relying on its prior ruling in *Cross Medical Products, Inc. v. DePuy AcroMed, Inc.*, 2003 U.S. Dist. LEXIS 26720, No. SA CV 00-876-GLT(ANx) (C.D. Cal. Jan. 9, 2003).

In *AcroMed*, the defendant had argued that "the top-loading nut would have been obvious in light of the problem to be solved, i.e., surgeons having difficulty tightening the bottom-loading nuts during [\*\*73] implantation." *Invalidity Opinion*, 2004 U.S. Dist. LEXIS 27644, [WLJ] at 7. The district court "found AcroMed failed to show motivation to combine because 'the problem was not discovered by looking at the prior art or the patent itself....It was only discovered when doctors tried to use the product.'" *Id.* The court cited *In re Sponnoble*, 56 C.C.P.A. 823, 405 F.2d 578, 585 (C.C.P.A. 1969), for the proposition that "'a patentable invention may lie in the discovery of the source of a problem even though the remedy may be obvious once the source of the problem is'" identified. *Invalidity Opinion*, 2004 U.S. Dist. LEXIS 27644, [WLJ] at 7.

The district court found that Medtronic offered no evidence that the problem was disclosed in the prior art. *Id.* The district court noted that "Defendants cite only the

'555 patent to describe the problem the '555 patent sought to fix." *Id.* The district court explained that "although Defendants argue the clinical investigators identified the problem with the bottom-loading nut, the investigators' letters are not prior art." *Id.* The district court acknowledged that "motivation to combine need not be explicit in the prior art; it can be implicit in the knowledge of one of skill in the [\*\*74] art," *id.* (quoting *Nat'l Steel Car, Ltd. v. Canadian Pac. Ry., Ltd.*, 357 F.3d 1319, 1337 (Fed. Cir. 2004)), but reasoned that "this rule does not change the result in this case because it does not relate to identification of the problem," 2004 U.S. Dist. LEXIS 27644, [WLJ] at 7. The district court then denied Medtronic's motion for summary judgment on obviousness and granted Cross Medical's cross motion. 2004 U.S. Dist. LEXIS 14183, [WLJ] at 7-8.

Medtronic argues that it presented sufficient evidence that the bottom-tightening-nut problem was known to those of ordinary skill in the art and that this provides a motivation to combine the '644 and '602 references. Medtronic cites communications from clinical investigators as evidence of recognition of the problem by those of ordinary skill in the art, and argues that the district court's analysis and adoption of the reasoning in *Sponnoble* were in error. In addition, Medtronic cites: (a) the '644 patent as evidence that bottom-tightening devices then available were problematic to assemble in situ; (b) U.S. Patent No. 5,261,913 ("the '913 patent") as evidence that it was within the knowledge of one of ordinary skill to use a top-tightening nut; and (c) the '555 patent [\*\*75] as evidence that prior art polyaxial screws designed with bottom-tightening nuts were awkward.<sup>3</sup> Medtronic argues that even if [\*1321] the '913 patent does not qualify as prior art, it evidences knowledge of one of ordinary skill in the art. Medtronic asserts that, at the least, this evidence is enough to create a genuine issue of material fact on motivation to combine.

<sup>3</sup> In a footnote in its opening brief, Medtronic asserts that the district court erroneously resolved a fact question as to whether Dr. Puno was an inventor of the Bryd device but never requests relief or provides record cites for its assertions. Medtronic makes no other reference to the Bryd device with respect to obviousness in its opening brief. In its response brief, Medtronic asserts that even if Dr. Puno is a joint inventor of the Bryd device, there is a different set of joint inventors on the Bryd device--Drs. Puno and Bryd--than on the

'555 *patent*--Dr. Puno and Mellinger. Medtronic argues that the two sets of inventors are separate legal entities under *In re Kaplan*, 789 F.2d 1574, 1575 (Fed. Cir. 1986), and that the Bryd device may be prior art under §§ 102(f) and 103. Medtronic adds that even if the Bryd device is confidential, it evidences knowledge of those of ordinary skill.

Medtronic has not properly raised the inventorship issue in its opening brief to warrant relief from this court. See *Fuji Photo Film Co. v. Jazz Photo Corp.*, 394 F.3d 1368, 1375 n.4 (Fed. Cir. 2005) (holding that this court will not address arguments that are not properly raised in the opening brief). Nor will this court consider Medtronic's new arguments raised for the first time in its reply brief. *Id.*

[\*\*76] Cross Medical counters that Dr. Puno was one of the clinical investigators who recognized the problem with the '602 device, that Dr. Puno discovered the problem as part of his inventive process, and thus that the clinical investigators' recognition of the problem is not evidence of a motivation to combine. Cross Medical argues that the '644 *patent* does not itself provide reason to apply its teachings to modify the '602 device because it discusses prior art assembly problems related to use of a locking nut and threaded rod to hold the screw. Cross Medical argues that the '602 device did not use a threaded rod with a locking nut, and thus the inventors did not confront the same problem as confronted by the inventors of the '644 device. Cross Medical asserts that the '913 *patent* cannot evidence knowledge of ordinary skill in the art at the time of the invention because the application that matured into the '913 *patent* was filed two months after the invention date of the '555 *patent*, and that application was not published for 18 months. Cross Medical cites differences between the '602 and '555 *patents* in addition to the bottom-tightening nut, and asserts that Medtronic submitted no evidence [\*\*77] explaining how the particular structural elements of the '602 device could be modified to achieve the structure disclosed in claim 5 as a whole. Cross Medical argues that Medtronic failed to discuss "trade-offs" to the use of the top-tightening device, and neglected to discuss secondary considerations.

"A claimed invention is unpatentable if the differences between it and the prior art are such that the

subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art." *In re Kotzab*, 217 F.3d 1365, 1369 (Fed. Cir. 2000); see 35 U.S.C. § 103. An invention may be a combination of old elements disclosed in multiple prior art references. *Kotzab*, 217 F.3d at 1369. In determining whether a combination of old elements is non-obvious, the court must assess whether, in fact, an artisan of ordinary skill in the art at the time of invention, with no knowledge of the claimed invention, would have some motivation to combine the teachings of one reference with the teachings of another reference. See *In re Fulton*, 391 F.3d 1195, 1200-02 (Fed. Cir. 2004). Motivation [\*\*78] to combine references "may come explicitly from statements in the prior art, the knowledge of one of ordinary skill in the art, or, in some cases the nature of the problem to be solved." *Kotzab*, 217 F.3d at 1370. "The test for an implicit teaching is what the combined references, knowledge of one of ordinary skill [\*1322] in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art." *Id.*

The sole issue before us is whether the district court erred in ruling that there is no genuine issue of material fact as to whether the subject matter as a whole would have been obvious to one of ordinary skill in the art at the time of the invention based on the absence of any evidence of a motivation to combine the '602 and '644 references. We conclude that a genuine issue of material fact exists with respect to motivation to combine. Cross Medical designated the screw disclosed in the '602 *patent* as the "PWB I" and performed a pilot study testing its use in humans. A paper, entitled "The Puno-Winter-Bird (PWB) Spinal System for Transpedicular Fixation of the Lumbar Spine," recounted that surgeons participating in the [\*\*79] pilot study found the implant design "tedious," and that it was "technically difficult to position the wrench when the nut was tightened, since it required that the nut be advanced from under the rod." The paper explained that "although [the PWB I] provided satisfactory fixation of the rod, the design was not 'user'" friendly. The paper noted that "[a] design improvement was in order and led to the development of the PWB II." Other evidence in the record confirms that surgeons in the pilot study recognized the problem and requested changes. The surgeons who participated in the pilot included investigators other than inventors of the '555 *patent*.

From this evidence, a reasonable juror could conclude that at the time of the invention, one of ordinary skill in the art could have been motivated to modify the PWB I in light of the problem to be solved. Giving credit to Medtronic's evidence, the clinical investigators recognized the bottom-tightening problem with the '602 device and proposed changes. The problem was within the general knowledge of those of ordinary skill in the art, and thus provided sufficient motivation to navigate the prior art in the spinal implant field in search [\*\*80] of a teaching on how one might modify the '602 device away from a bottom-tightening assembly.

The district court erred in discounting the clinical investigators' recognition of the problem. "It has long been the law that the motivation to combine need not be found in prior art references, but equally can be found 'in the knowledge generally available to one of ordinary skill in the " art. *Nat'l Steel*, 357 F.3d at 1337 (quoting *In re Jones*, 958 F.2d 347, 351 (Fed. Cir. 1992)). Evidence of a motivation to combine references need not be in the form of prior art. See *id.* at 1338-39. Evidence that a person of ordinary skill in the art recognized the same problem to be solved as the inventor and suggested a solution is, at the least, probative of a person of ordinary skill in the art's willingness to search the prior art in the same field for a suggestion on how to solve that problem. See *Pro-Mold & Tool Co. v. Great Lakes Plastics, Inc.*, 75 F.3d 1568, 1573 (Fed. Cir. 1996) (Motivation to combine "may also come from the nature of a problem to be solved, leading inventors to look to references relating to possible solutions to that [\*\*81] problem." (citing *Application of Rinehart*, 531 F.2d 1048, 1054 (C.C.P.A. 1976)); *In re Huang*, 100 F.3d 135, 139 n.5 (Fed. Cir. 1996) (stating that problem well-known to a person of ordinary skill in the art would have directed that person of ordinary skill to the reference teaching the missing elements); see also, e.g., *In re Gartside*, 203 F.3d 1305, 1320-21 (Fed. Cir. 2000) (recognizing that motivation to combine can come from the nature of the problem to be solved); *In re Rouffet*, 149 F.3d 1350, 1355 (Fed. Cir. 1998) (same). To the extent that the district court determined [\*1323] that the only investigators who recognized the problem of the bottom-tightening assembly were inventors on the '555 patent, that conclusion has no basis in the record.

Furthermore, the district court's reliance on *Sponnoble* is misplaced. In that case, those of ordinary skill in the art of packaging pharmaceutical products

recognized a moisture-transfer problem with "structure[s] for temporarily isolating a compartment containing a solid pharmaceutical product from a compartment containing an aqueous solution." *Sponnoble*, 405 F.2d at 585. [\*\*82] The industry believed that moisture was transmitted *around* the plug separating the two compartments. *Id.* at 586. Sponnoble discovered that moisture traveled *through* the plug and remedied that problem with a solution available in the prior art. *Id.* Our predecessor court held that the invention was non-obvious because one of ordinary skill in the art would not have chosen the solution without recognizing the true cause of the problem, and "the cause of the problem [was] not suggested by the prior art." *Id.* In this case, however, the problem was known to the clinical investigators at the time of the invention, and thus, unlike *Sponnoble*, the problem was within the general knowledge of one of ordinary skill in the art. See *Nat'l Steel*, 357 F.3d at 1338 ("Something that has already been rendered obvious to a newcomer in the field is probative of what would be obvious to someone who has been around for a longer period of time."). If the problem is within the knowledge of one of ordinary skill in the art, then it is irrelevant that the prior art does not disclose the problem. See *id.* at 1337-39.

Moreover, we conclude--after drawing [\*\*83] inferences in favor of Medtronic--that the '644 patent itself may have provided sufficient motivation for one of ordinary skill to have considered its teachings and altered the '602 device. The '644 invention was an improvement over prior art spinal implant devices which used a threaded rod with locking nuts. In characterizing the prior art, the patent states that "the need to thread the nut along the rod results in the device being rather slow to assemble and can result in damage to soft tissue if carried out in situ." '644 patent, col. 2, ll. 10-12. The solution was, in part, a top-tightening nut. See *id.*, col. 3, ll. 16-23; *id.*, Figure 2. Thus, the '644 patent discusses a problem posed by the assembly of certain spinal stabilization devices in situ and a solution. Confronted with the implantation problem of the '602 device, one of ordinary skill might have found the problem solved by the '644 patent sufficiently analogous to have been motivated to apply its teachings. In turn, we reject Cross Medical's contention that the '644 device cannot provide the requisite motivation because the problem it addressed may have differed slightly from the problem encountered by surgeons [\*\*84] using the '602 device. One of ordinary skill in the art need not see the identical problem

addressed in a prior art reference to be motivated to apply its teachings. See *In re Oetiker*, 977 F.2d 1443, 1448 (Fed. Cir. 1992) (Nies, C.J., concurring) ("Such suggestion or motivation to combine prior art teachings can derive solely from the existence of a teaching, which one of ordinary skill in the art would be presumed to know, and the use of that teaching to solve *the same or similar problem* which it addresses." (citing *In re Wood*, 599 F.2d 1032, 1037 (C.C.P.A. 1979)) (emphasis added)); cf. *In re Dillon*, 919 F.2d 688, 694 (Fed. Cir. 1990) (en banc) ("[A] reference is not from a non-analogous art if] the reference is reasonably pertinent to the particular problem with which the inventor was " involved. (quoting *In re Deminski*, 796 F.2d 436, 442 (Fed. Cir. 1986) (quoting in turn from *Wood*, 599 F.2d at 1036)).

[\*1324] As to the other evidence cited by Medtronic, the '555 patent suggests that the inventor recognized the problem of bottom-tightening. However, the patent does not provide evidence that the [\*85] problem was within the knowledge of those of ordinary skill in the art at the time of the invention; or that the problem was disclosed in the prior art. The '913 patent is also of limited relevance because it issued after the invention date. See *Mahurkar v. C.R. Bard, Inc.*, 79 F.3d 1572, 1576-77 (Fed. Cir. 1996).

Thus, we conclude that, because there are genuine issues of material fact on the underlying facts related to obviousness, the grant of summary judgment was in

error.

### III. CONCLUSION

We conclude that we have jurisdiction over this appeal. We affirm the district court's construction of the "anchoring means," "securing means," and "bear against said channel" limitations, but modify the district court's construction of the "operatively joined" and the "anchor seat means" limitations. Because we find genuine issues of material fact regarding infringement, we reverse the grant of Cross Medical's motion for partial summary judgment of infringement and find no abuse of discretion in the denial of Medtronic's cross-motion for partial summary judgment of non-infringement. We also reverse the grant of Cross Medical's motion for partial summary judgment that claim [\*86] 5 is not obvious but affirm the grant of that motion as to indefiniteness and anticipation. We further conclude that the district court did not abuse its discretion in denying Medtronic's cross-motion for summary judgment as to these invalidity issues. As a result, we vacate the permanent injunction. We remand for further proceedings consistent with this opinion.

*AFFIRMED-IN-PART, REVERSED-IN-PART,  
VACATED-IN-PART, AND REMANDED.*

### COSTS

Costs to Medtronic.

LEXSEE 425 U.S. 219

**DANN, COMMISSIONER OF PATENTS AND TRADEMARKS v. JOHNSTON**

**No. 74-1033**

**SUPREME COURT OF THE UNITED STATES**

**425 U.S. 219; 96 S. Ct. 1393; 47 L. Ed. 2d 692; 1976 U.S. LEXIS 95; 189 U.S.P.Q.  
(BNA) 257**

**Argued December 9, 1975  
March 31, 1976**

**PRIOR HISTORY:** CERTIORARI TO THE UNITED STATES COURT OF CUSTOMS AND PATENT APPEALS

automatic data processing system for use in a large business organization to record information as to transactions in each department of the organization.

Blackmun and Stevens, JJ., did not participate.

**SUMMARY:**

A patent was sought for a computer system for automatic record keeping of bank checks and deposits, permitting a bank--by using machine readable checks and deposit slips, bearing numerical category codes for various types of expenditures and sources of deposited funds--to furnish a customer with subtotals for each category of transactions conducted through the customer's single bank account. Both a patent examiner and the Patent and Trademark Office Board of Appeals rejected the patent application on various grounds, including obviousness under 103 of the Patent Act (35 USCS 103), which provides that a patent may not be obtained if the subject matter would have been obvious at the time the invention was made to a person having ordinary skill in the applicable art. The United States Court of Customs and Patent Appeals reversed the Board's decision, holding that the patent applicant's system was not obvious under prior art (502 F2d 765).

On certiorari, the United States Supreme Court reversed and remanded. In an opinion by Marshall, J., expressing the unanimous view of the seven participating members of the court, it was held that the applicant's computer system was unpatentable under 103 of the Patent Act as being obvious to one reasonably skilled in the applicable art, in view of the prior art with regard to (1) the nature of the current use of data processing equipment and computer programs in the banking industry, and (2) an earlier patent to another person for an automatic data processing system for use in a large business organization to record detailed information as to transactions in each department of the organization.

**LAWYERS' EDITION HEADNOTES:**

[\*\*\*LEdHN1]

PATENTS §19.1

obviousness -- computer system for banks --

Headnote:[1A][1B][1C]

A computer system for automatic record keeping of bank checks and deposits, permitting a bank--by using machine readable checks and deposit slips bearing numerical category codes for various types of expenditures and sources of deposited funds--to furnish a customer with subtotals for each category of transactions conducted through the customer's single bank account, is unpatentable under 103 of the Patent Act (35 USCS 103) as being obvious to one reasonably skilled in the applicable art, in view of the prior art with regard to (1) the nature of the current use of data processing equipment and computer programs in the banking industry, and (2) an earlier patent to another person for an automatic data processing system for use in a large business organization to record detailed information as to transactions in each department of the organization.

[\*\*\*LEdHN2]

PATENTS §19.1

425 U.S. 219, \*; 96 S. Ct. 1393, \*\*;  
47 L. Ed. 2d 692, \*\*\*LEdHN2; 1976 U.S. LEXIS 95

obviousness -- relevant factors --

Headnote:[2]

Under 103 of the Patent Act (*35 USCS 103*)--which provides that a patent may not be obtained if the subject matter would have been obvious at the time the invention was made to a person having ordinary skill in the applicable art--the central factors relevant to any inquiry into obviousness are (1) the scope and content of the prior art, (2) the differences between the prior art and the claims at issue, and (3) the level of ordinary skill in the pertinent art.

[\*\*\*LEdHN3]

PATENTS §19.1

obviousness -- prior art --

Headnote:[3]

Under 103 of the Patent Act (*35 USCS 103*)--which provides that a patent may not be obtained if the subject matter would have been obvious at the time the invention was made to a person having ordinary skill in the applicable art--the "obviousness" test is not one which turns on whether an invention is equivalent to some element in the prior art but rather whether the difference between the prior art and the subject matter in question is sufficient to render the claimed subject matter unobvious to one skilled in the applicable art.

[\*\*\*LEdHN4]

PATENTS §19.1

obviousness -- person skilled in art --

Headnote:[4]

In making a determination of "obviousness" under 103 of the Patent Act (*35 USCS 103*)--which provides that a patent may not be obtained if the subject matter would have been obvious at the time the invention was made to a person having ordinary skill in the applicable art--the criteria is measured not in terms of what would be obvious to a layman, but rather what would be obvious to one reasonably skilled in the applicable art.

[\*\*\*LEdHN5]

PATENTS §19.1

obviousness -- prior art --

Headnote:[5]

The mere existence of differences between the prior art and an invention does not establish the invention's nonobviousness for purposes of 103 of the Patent Act (*35 USCS 103*), which provides that a patent may not be obtained if the subject matter would have been obvious at the time the invention was made to a person having ordinary skill in the applicable art.

[\*\*\*LEdHN6]

PATENTS §18

commercial success -- obviousness --

Headnote:[6A][6B]

Although commercial success without invention will not make patentability, nevertheless secondary considerations such as commercial success, long felt but unsolved needs, and failure of others may be relevant in a determination of obviousness under 103 of the Patent Act (*35 USCS 103*), which provides that a patent may not be obtained if the subject matter would have been obvious at the time the invention was made to a person having ordinary skill in the art.

## SYLLABUS

Respondent's "machine system for automatic record-keeping of Sbank checks and deposits," under which checks and deposits are customer-labeled with code categories which are "read," and then processed by a data processor, such as a programmable electronic digital computer, having data storage files and a control system, permitting a bank to furnish a customer with an individual and categorized breakdown of his transactions during the period in question, held upatentable on grounds of obviousness. *35 U.S.C. § 103*. Pp. 225-230.I

*502 F. 2d 765, reversed and remanded.*

MARSHALL, J., delivered the opinion of the Court, in which all Members joined except BLACKMUN and STEVENS, JJ., who took no part in the consideration or decision of the case.

**COUNSEL:** Howard E. Shapiro argued the cause for petitioner. With him on the brief were Solicitor General

425 U.S. 219, \*; 96 S. Ct. 1393, \*\*;  
47 L. Ed. 2d 692, \*\*\*; 1976 U.S. LEXIS 95

*Bork, Assistant Attorney General Kauper, Gerald P. Norton, Richard H. Stern, and Karl E. Bakke.*

*Morton C. Jacobs* argued the cause and filed a brief for respondent.\*

\* *John S. Voorhees* and *Kenneth E. Krosin* filed a brief for the Computer & Business Equipment Manufacturers Assn. as *amicus curiae* urging reversal.

Briefs of *amici curiae* urging affirmance were filed by *Carol A. Cohen* for Applied Data Research, Inc.; by *David Cohen* for the Association of Data Processing Service Organizations, Software Industry Assn.; and by *Charles Winn Sims* and *Francis Noel Carten* for Universal Software, Inc.

Briefs of *amici curiae* were filed by *Richard E. Kurtz*, *Jack C. Goldstein*, and *Arthur R. Whale* for the American Patent Law Assn.; by *Reed C. Lawlor*, *Theodore H. Lassagne*, *David E. Lovejoy*, and *John P. Sutton* for the California Patent Law Assn.; by *James W. Geriak* and *John C. Dorfman* for the Los Angeles and Philadelphia Patent Law Assns.; and by *Mr. Lawlor* for Software Associates, Inc.

**JUDGES:** BURGER, BRENNAN, STEWART, WHITE, MARSHALL, POWELL, REHNQUIST; BLACKMUN AND STEVENS took no part in the consideration or decision of the case.

#### **OPINION BY: MARSHALL**

#### **OPINION**

[\*220] [\*\*\*694] [\*\*1394] MR. JUSTICE MARSHALL delivered the opinion of the Court.

Respondent has applied for a patent on what is described in his patent application as a "machine system for automatic record-keeping of bank checks and deposits." The system permits a bank to furnish a customer with subtotals of various categories of transactions completed in connection with the customer's single account, thus saving the customer the time and/or expense of conducting this bookkeeping himself. As respondent has noted, the "invention is being sold as a computer program to banks and to other data processing

companies so that they can perform these data processing services for depositors." Brief for Respondent 19A; *Application of Johnston*, 502 F. 2d 765 (CCPA 1974).

[\*\*\*695] [\*\*\*LEdHR1A] [1A]Petitioner and respondent, as well as various *amici*, have presented lengthy arguments addressed to the question of the general patentability of computer programs. Cf. *Gottschalk v. Benson*, 409 U.S. 63 (1972). We find no need to treat that question in this case, however, because we conclude that in any event respondent's system is unpatentable on grounds of obviousness. 35 U.S.C. § 103. Since the United States Court of Customs and Patent Appeals (CCPA) found respondent's system to be patentable, *Application of Johnston*, *supra*, the decision of that court is accordingly reversed.

#### I

While respondent's patent application pertains to the highly esoteric field of computer technology, [\*221] the basic functioning of his invention is not difficult to comprehend. Under respondent's system a bank customer labels each check that he writes with a numerical category code corresponding to the purpose for which the funds are being expended. For instance, "food expenditures" might be a category coded "123," "fuel expenditures" a category coded "124," [\*\*1395] and "rent" still another category coded "125." Similarly, on each deposit slip, the customer, again through a category code, indicates the source of the funds that he is depositing. When the checks and deposit slips are processed by the bank, the category codes are entered upon them in magnetic ink characters, just as, under existing procedures, the amount of the check or deposit is entered in such characters. Entries in magnetic ink allow the information associated with them to be "read" by special document-reading devices and then processed by data processors. On being read by such a device, the coded records of the customer's transactions are electronically stored in what respondent terms a "transaction file." Respondent's application describes the steps from this point as follows: S"To process the transaction file, the... system employs a data processor, such as a programmable electronic digital computer, having certain data storage files and a control system. In addition to the transaction file, a master record-keeping file is used to store all of the records required for each

425 U.S. 219, \*221; 96 S. Ct. 1393, \*\*1395;  
47 L. Ed. 2d 692, \*\*\*LEDHR1A; 1976 U.S. LEXIS 95

customer in accordance with the customer's own chart of accounts. The latter is individually designed to the customer's needs and also constructed to cooperate with the control system in the processing of the customer's transactions. The control system directs the generation of periodic output [\*222] reports for the customer which present the customer's transaction records in accordance with his own chart of accounts and desired accounting procedures." Pet. for Cert. 4A-5A.I

Thus, when the time comes for the bank customer's regular periodic statement to be rendered, the programmed computer sorts out the entries in the various categories and produces a statement which groups the entries according to category and which gives subtotals for each category. The customer can then quickly see how much he spent or received in any given category during the period in question. Moreover, according to respondent, the system can "[adapt] to whatever variations [\*\*\*696] in ledger format a user may specify." Brief for Respondent 66.

In further description of the control system that is used in the invention, respondent's application recites that it is made up of a general control and a master control. The general control directs the processing operations common to most customers and is in the form of a software computer program, *i.e.*, a program that is meant to be used in a general-purpose digital computer. The master control, directing the operations that vary on an individual basis with each customer, is in the form of a separate sequence of records for each customer containing suitable machine-instruction mechanisms along with the customer's financial data. Respondent's application sets out a flow chart of a program compatible with an IBM 1400 computer which would effectuate his system.

Under respondent's invention, then, a general purpose computer is programmed to provide bank customers with an individualized and categorized breakdown of their transactions during the period in question.

[\*223] II After reviewing respondent's patent application, the patent examiner rejected all the claims therein. He found that respondent's claims were invalid as being anticipated by the prior art, 35 U.S.C. § 102, and as not "particularly pointing out and distinctly claiming" what respondent was urging to be his invention. § 112.

Respondent appealed to the Patent and Trademark Office Board of Appeals. The Board rejected respondent's application on several grounds. It found first that under § 112, the application was indefinite and did not distinctly enough claim what respondent was urging to be his invention. It also concluded that respondent's claims were invalid under § 101 because they claimed nonstatutory subject matter. According to the Board, computer-related inventions which extend "beyond the field of technology... are nonstatutory," Pet. for Cert. 31A. See *Application of Foster*, 58 C.C.P.A. (Pat.) 1001, 1004, [\*\*1396] 438 F. 2d 1011, 1015 (1971); *Application of Musgrave*, 57 C.C.P.A. (Pat.) 1352, 431 F. 2d 882 (1970), and respondent's claims were viewed to be "non-technological." Finally, respondent's claims were rejected on grounds of obviousness. 35 U.S.C. § 103. The Board found that respondent's claims were obvious variations of established uses of digital computers in banking and obvious variations of an invention, developed for use in business organizations, that had already been patented. Dirks, U.S. Patent No. 3,343,133.

The CCPA, in a 3-2 ruling, reversed the decision of the Board and held respondent's invention to be patentable. The court began by distinguishing its view of respondent's invention as a "'record-keeping machine system for financial accounts'" from the Board's rather negative view of the claims as going solely to the "relationship of [\*224] a bank and its customers." 502 F. 2d, at 770 (emphasis in CCPA opinion). As such, the CCPA held, respondent's system was "clearly within the 'technological arts,'" *id.*, at 771, and was therefore statutory subject matter under 35 [\*\*\*697] U.S.C. § 101. Moreover, the court held that respondent's claims were narrowly enough drawn and sufficiently detailed to pass muster under the definiteness requirements of § 112. Dealing with the final area of the Board's rejection, the CCPA found that neither established banking practice nor the Dirks patent rendered respondent's system "obvious to one of ordinary skill in the art who did not have [respondent's] specification before him." 502 F. 2d, at 772.

In order to hold respondent's invention to be patentable, the CCPA also found it necessary to distinguish this Court's decision in *Gottschalk v. Benson*, 409 U.S. 63 (1972), handed down some 13 months subsequent to the Board's ruling in the instant case. In *Benson*, the respondent sought to patent as a "new and

425 U.S. 219, \*224; 96 S. Ct. 1393, \*\*1396;  
47 L. Ed. 2d 692, \*\*\*697; 1976 U.S. LEXIS 95

useful process," 35 U.S.C. § 101, "a method of programming a general-purpose digital computer to convert signals from binary-coded decimal form into pure binary form." 409 U.S., at 65. As we observed: The claims were not limited to any particular art or technology, to any particular apparatus or machinery, or to any particular end use." *Id.*, at 64. Our limited holding, *id.*, at 71, was that respondent's method was not a patentable "process" as that term is defined in 35 U.S.C. § 100 (b).<sup>1</sup>

1 "The term 'process' means process, art or method, and includes a new use of a known process, machine, manufacture, composition of matter, or material." 35 U.S.C. § 100 (b).

The Solicitor of the Patent Office argued before the CCPA that *Benson's* holding of nonpatentability as to the computer program in that case was controlling here. [\*225] However, the CCPA concluded that while *Benson* involved a claim as to the patentability of a "process," respondent in this case was advancing claims as to the patentability of an "apparatus" or "machine" which did not involve discoveries so abstract as to be unpatentable: "The issue considered by the Supreme Court in *Benson* was a narrow one, namely, is a formula for converting binary coded decimal numerals into pure binary numerals by a series of mathematical calculations a patentable process?" (Emphasis added.)] [Quoting *In re Christensen*, 478 F. 2d 1392, 1394 (CCPA 1973).

"[T]he instant claims in *apparatus* form do not claim or encompass a law of nature, a mathematical formula, or an algorithm." 502 F. 2d, at 771 (emphasis in CCPA opinion). Having disposed of the Board's rejections and having distinguished *Benson* to its satisfaction, the court held respondent's invention to be patentable. The Commissioner of Patents sought review in this Court and we granted certiorari. 421 U.S. 962 (1975). We hold that respondent's invention was obvious under 35 U.S.C. § 103 and therefore reverse.

### III

As a judicial test, "invention" - i.e., "an exercise of the inventive faculty, [\*\*1397] " *McClain v. Ortmayer*, 141 U.S. 419, 427 (1891) - has long been regarded as [\*\*\*698] an absolute prerequisite to patentability. See, e.g., *Keystone Driller Co. v. Northwest Engineering Corp.*, 294 U.S. 42 (1935); *Sharp v. Stamping Co.*, 103 U.S. 250 (1880); *Hotchkiss v. Greenwood*, 11 How. 248

(1851). However, it was only in 1952 that Congress, in the interest of "uniformity and definiteness," articulated the requirement in a statute, [\*226] framing it as a requirement of "nonobviousness."<sup>2</sup> Section 103 of the Patent Act of 1952, 35 U.S.C. § 103, provides in full: "A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made."<sup>3</sup>

2 S. Rep. No. 1979, 82d Cong., 2d Sess., 6 (1952); H.R. Rep. No. 1923, 82d Cong., 2d Sess., 7 (1952).

[\*\*\*LEdHR2] [2]This Court treated the scope of § 103 in detail in *Graham v. John Deere Co.*, 383 U.S. 1 (1966). There, we held that § 103 "was not intended by Congress to change the general level of patentable invention," but was meant "merely as a codification of judicial precedents... with congressional directions that inquiries into the obviousness of the subject matter sought to be patented are a prerequisite to patentability." *Id.*, at 17. While recognizing the inevitability of difficulty in making the determination in some cases, we also set out in *Graham*, *supra*, the central factors relevant to any inquiry into obviousness: "the scope and content of the prior art," the "differences between the prior art and the claims at issue," and "the level of ordinary skill in the pertinent art." *Ibid.* Guided by these factors, we proceed to an inquiry into the obviousness of respondent's

[\*\*\*LEdHR1B] [1B]system.

As noted, *supra*, at 223, the Patent and Trademark Office Board of Appeals relied on two elements in the prior art in reaching its conclusion that respondent's [\*227] system was obvious. We find both to be highly significant. The first was the nature of the current use of data processing equipment and computer programs in the banking industry. As respondent's application itself observes, that use is extensive: S

"Automatic data processing equipments employing digital computers have been developed for the handling

425 U.S. 219, \*227; 96 S. Ct. 1393, \*\*1397;  
47 L. Ed. 2d 692, \*\*\*LEDHR1B; 1976 U.S. LEXIS 95

of much of the record-keeping operations involved in a banking system. The checks and deposit slips are automatically processed by forming those items as machine-readable records.... With such machine systems, most of the extensive data handling required in a bank can be performed automatically." Pet. for Cert. 3A.I

It is through the use of such data processing equipment that periodic statements are ordinarily given to a bank customer on each of the several accounts that he may have at a [\*\*\*699] given bank. Under respondent's system, what might previously have been separate accounts are treated as a single account, and the customer can see on a single statement the status and progress of each of his "subaccounts." Respondent's "category code" scheme, see *supra*, at 221, is, we think, closely analogous to a bank's offering its customers multiple accounts from which to choose for making a deposit or writing a check. Indeed, as noted by the Board, the addition of a category number, varying with the nature of the transaction, to the end of a bank customer's regular account number, creates "in effect, a series [\*\*1398] of different and distinct account numbers...." Pet. for Cert. 34A. Moreover, we note that banks have long segregated debits attributable to service charges *within* any given separate account and have rendered their customers subtotals for those charges.

[\*\*\*LEDHR3] [3]The utilization of automatic data processing equipment in the traditional separate account system is, of course, [\*228] somewhat different from the system encompassed by respondent's invention. As the CCPA noted, respondent's invention does something other than "provide a customer with... a summary sheet consisting of net totals of plural separate accounts which a customer may have at a bank." 502 F. 2d, at 771. However, it must be remembered that the "obviousness" test of § 103 is not one which turns on whether an invention is equivalent to some element in the prior art but rather whether the difference between the prior art and the subject matter in question "is a difference sufficient to render the claimed subject matter unobvious to one skilled in the applicable art...." *Id.*, at 772 (Markey, C.J., dissenting).

[\*\*\*LEDHR1C] [1C] There is no need to make the obviousness determination in this case turn solely on the nature of the current use of data processing and computer programming in the banking industry. For, as noted, the Board pointed to a second factor - a patent issued to

Gerhard Dirks - which also supports a conclusion of obviousness. The Dirks patent discloses a complex automatic data processing system using a programmed digital computer for use in a large business organization. Under the system transaction and balance files can be kept and updated for each department of the organization. The Dirks system allows a breakdown within each department of various areas, e.g., of different types of expenses. Moreover, the system is sufficiently flexible to provide additional breakdowns of "sub-areas" within the areas and can record and store specially designated information regarding each of any department's transactions. Thus, for instance, under the Dirks system the disbursing office of a corporation can continually be kept apprised of the precise level and nature of the corporation's disbursements within various areas or, as the Dirks patent terms them, "Item Groups."

[\*229] Again, as was the case with the prior art within the banking industry the Dirks invention is not equivalent to respondent's system. However, the departments of the business organization and the areas or "Item Groups" under the Dirks system are closely analogous to the bank customers and category number designations respectively under respondent's system. And each [\*\*\*700] shares a similar capacity to provide breakdowns within its "Item Groups" or category numbers. While the Dirks invention is not designed specifically for application to the banking industry many of its characteristics and capabilities are similar to those of respondent's system. Cf. *Graham*, 383 U.S., at 35.

[\*\*\*LEDHR4] [4]In making the determination of "obviousness," it is important to remember that the criterion is measured not in terms of what would be obvious to a layman, but rather what would be obvious to one "reasonably skilled in [the applicable] art." *Id.*, at 37. In the context of the subject matter of the instant case, it can be assumed that such a hypothetical person would have been aware both of the nature of the extensive use of data processing systems in the banking industry and of the system encompassed in the Dirks patent. While computer technology is an exploding one, "[i]t is but an evenhanded application to require that those persons granted the benefit of a patent monopoly be charged with an awareness" of that technology. *Id.*, at 19.

[\*\*\*LEDHR5] [5] [\*\*\*LEDHR6A] [6A]Assuming such an awareness, respondent's system would, we think, have been obvious to one "reasonably skilled in [the

425 U.S. 219, \*229; 96 S. Ct. 1393, \*\*1398;  
47 L. Ed. 2d 692, \*\*\*LEDHR6A; 1976 U.S. LEXIS 95

applicable] art." There may be differences between respondent's invention and [\*\*1399] the state of the prior art. Respondent makes much of his system's ability to allow "a large number of small users to get the benefit of large-scale electronic computer equipment and still continue to use their individual ledger format and [\*230] bookkeeping methods." Brief for Respondent 65. It may be that that ability is not possessed to the same extent either by existing machine systems in the banking industry or by the Dirks system.<sup>3</sup> But the mere existence of differences between the prior art and an invention does not establish the invention's nonobviousness. The gap between the prior art and respondent's system is simply not so great as to render the system nonobvious to one reasonably skilled in the art.<sup>4</sup>

#### [\*\*\*LEDHR6B] [6B]

<sup>3</sup> The Dirks patent does allow "the departments or other organizational users [*i.e.*, the analogues to bank customers under respondent's invention, to] retain their authority over operative file systems" and indicates that "[p]rogramming is very easy and different programs are very easily coordinated."

<sup>4</sup> While "commercial success without invention will not make patentability," *A&P Tea Co. v. Supermarket Corp.*, 340 U.S. 147, 153 (1950), we did indicate in *Graham v. John Deere Co.*, 383 U.S. 1 (1966), that "secondary considerations [such] as commercial success, long felt but unsolved needs, [and] failure of others" may be relevant in a determination of obviousness. *Id.*, at 17. Respondent does not contend nor can we conclude that any of these secondary considerations offer any substantial support for

his claims of nonobviousness.

Accordingly, we reverse the Court of Customs and Patent Appeals and remand this case to that court for further proceedings consistent with this opinion.

*So ordered.*

MR. JUSTICE BLACKMUN and MR. JUSTICE STEVENS took no part in the consideration or decision of this case.

#### REFERENCES

*60 Am Jur 2d, Patents* 53-86

19 Am Jur Pl & Pr Forms (Rev ed), Patents, Forms 1-6

14 Am Jur Legal Forms 2d, Patents 196:11 et seq.

35 USCS 103

US L Ed Digest, Patents 19.1

ALR Digests, Patents 7

L Ed Index to Annos, Computers; Patents

ALR Quick Index, Computers; Patents

Federal Quick Index, Computers; Patents

#### Annotation References:

Application and effect of 35 USCS 103, requiring nonobvious subject matter, in determining validity of patents. 23 ALR Fed 326.

Patentability of computer programs. 6 ALR Fed 156.

LEXSEE 910 F.2D 831

**IN RE RAYMOND G. BOND**

**No. 90-1023**

**UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT**

**910 F.2d 831; 1990 U.S. App. LEXIS 13087; 15 U.S.P.Q.2D (BNA) 1566**

**August 3, 1990, Decided**

**SUBSEQUENT HISTORY:**     [\*\*1] As Corrected August 10, 1990. Rehearing Denied November 1, 1990. Reported at: *1990 U.S. App. LEXIS 19971*.

**PRIOR HISTORY:**     Appealed from U.S. Patent & Trademark Office Board of Patent Appeals & Interferences.

**COUNSEL:** Keith D. Beecher, Jessup, Beecher & Slehofer, of Santa Monica, California, argued for Appellant.

Muriel E. Crawford, Assistant Solicitor, Office of the Solicitor, of Arlington, Virginia, argued for Appellee. With her on the brief was Fred E. McKelvey, Solicitor.

**JUDGES:** Archer, Circuit Judge, Baldwin, Senior Circuit Judge, and Tashima, District Judge. \*

\* District Judge A. Wallace Tashima of the Central District of California, sitting by designation.

**OPINION BY: PER CURIAM**

**OPINION**

[\*832] This appeal is from the decision of the United States Patent and Trademark Office Board of Patent Appeals and Interferences (Board), Appeal No. 89-1286, dated June 30, 1989, affirming the examiner's final rejection of both claims of Raymond G. Bond's patent application Serial No. 840,007, filed March 17, 1986, entitled "Remote Turn-on Control System for Telephone Answering Machine." We vacate-in-part, reverse-in-part and remand.

I

The application involves one of the [\*\*2] remote control features of a telephone answering machine, the remote turn-on feature. The machine owner who forgot to set the machine to answer (e.g., it was set to play back messages) can call the machine and set it to answering mode remotely by ringing the phone a certain number of times. Once the machine is set, it will remain in this mode and answer calls until it is set to another mode. In this respect, the application involves technology essentially identical to the device patented by Curtis, et al., U.S. Patent No. 3,723,656 (Curtis).

Bond claims a combination of the above technology and a delay means which would prevent the machine from answering the owner's initial call for a predetermined period of time after it has set itself to answer (claim 1). Bond argues that the prior art does not leave sufficient time to hang up after setting the machine to answer, and the owner therefore may incur toll charges. Claim 1 was rejected under 35 U.S.C. § 102 over Curtis. Bond also claims the use of a microcomputer containing an internal counter to implement the control and delay structures (claim 2). Claim 2 was rejected under 35 U.S.C. § 103 [\*\*3] over Curtis in view of Hanscom.<sup>1</sup>

1 Hanscom was awarded U.S. Patent No. 4,400,586 for a "Remote Message Repeat Control For Telephone Answering System." Hanscom's claimed invention includes a means for retrieving messages remotely using a "beeper" to alert the machine that it should perform that function. The Hanscom specification provides that the essential control functions are performed by a microcomputer.

910 F.2d 831, \*832; 1990 U.S. App. LEXIS 13087, \*\*3;  
15 U.S.P.Q.2D (BNA) 1566

## II

The Board affirmed the examiner's rejection of claim 1. "For a prior art reference to anticipate in terms of 35 U.S.C. § 102, every element of the claimed invention must be identically shown in a single reference." *Diversitech Corp. v. Century Steps, Inc.*, 850 F.2d 675, 677, 7 USPQ2d 1315, 1317 (Fed. Cir. 1988). These elements must be arranged as in the claim under review, *Lindemann Maschinenfabrik v. American Hoist & Derrick Co.*, 730 F.2d 1452, 1458, 221 USPQ 481, 485 (Fed. Cir. 1984), [\*\*4] but this is not an "ipsissimis verbis" test, *Akzo N.V. v. United States Int'l Trade Comm'n*, 808 F.2d 1471, 1479 & n. 11, 1 USPQ2d 1241, 1245 & n. 11 (Fed. Cir. [\*\*833] 1986), cert. denied, 482 U.S. 909, 96 L. Ed. 2d 382, 107 S. Ct. 2490 (1987). "Anticipation is a fact question subject to review under the clearly erroneous standard." *In re King*, 801 F.2d 1324, 1326, 231 USPQ 136, 138 (Fed. Cir. 1986).

Claim 1 provides for a combination of control means, first circuit means, second circuit means, and

delay means included in said control means for delaying the seizure of said telephone line by said second circuit means for a predetermined time interval after said telephone answering machine has been set to said automatic answering mode so as to permit the calling party to get off the telephone line and avoid telephone charges.

"It is axiomatic that, in proceedings before the PTO, claims in an application are to be given their [\*\*5] broadest reasonable interpretation consistent with the specification, [] and that claim language should be read in light of the specification as it would be interpreted by one of ordinary skill in the art." *In re Sneed*, 710 F.2d 1544, 1548, 218 USPQ 385, 388 (Fed. Cir. 1983) (citations omitted). The specification provides that this delay is implemented through digital means as follows:

When the telephone answering machine is so set to the automatic answer mode, an internal counter in the microcomputer Z107 delays the time until pin 31 goes high, so that actual line seizure is delayed. This permits the calling party to get off the

line before any toll charges are assessed.

Once pin 31 "goes high," the answering machine immediately seizes the line. By contrast, seizure of the line is delayed in the Curtis device through analog means. A delay occurs between the time the machine sets to answer -- in response to, for example, the tenth ring signal -- and the seizure of the line -- which takes place only on receipt of the next ring signal.<sup>3</sup>

2 The board found that "Curtis disclosed a delay means (R1-R5, C3-C4 and the fixed time between rings) which delays the seizure of the telephone line for a predetermined time after the machine has been set." It would seem from our review of the Curtis disclosure that resistors R1 - R5 and capacitors C3 and C4 do not function to produce any delay *after* the device is energized, i.e., set to the automatic answering mode. Rather, their role seems to be limited to producing the delay that precedes the energizing of the answering device. If our understanding of the Curtis disclosure is correct, the delay experienced by the Curtis device between the time the device is energized and the time it seizes the telephone line is a function solely of the fixed time between telephone rings, which delay is not produced by structure within the Curtis device. In view of our vacatur and remand of the board's decision regarding claim 1 on other grounds, we need not further consider the question of whether there is structure in Curtis to delay seizure of the line after the device is energized.

[\*\*6]

3 The board found that in the Curtis device "the line is not seized immediately but only *after* one additional ring" (emphasis added); the Curtis specification discloses that the incoming call is answered by the answering machine "on" the next ring. See col. 4, lines 16-17.

The disclosed and prior art structures are not identical, but the claim may nonetheless be anticipated. While a "means-plus-function" limitation may appear to include all means capable of achieving the desired function, the statute requires that it be "construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof." 35 U.S.C. § 112 para. 6 (emphasis added); see *In re Iwahashi*, 888 F.2d 1370, 1375 n. 1, 12 USPQ2d 1908, 1912 n. 1 (Fed.

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*Cir. 1989*) (applying § 112 para. 6 to PTO proceedings, and harmonizing prior case law); *Johnston v. Ivac Corp.*, 885 F.2d 1574, 1580, 12 USPQ2d 1382, 1386 (Fed. Cir. 1989) [\*\*7] ("section 112 para. 6 operates to *cut back* on the types of *means* which could literally satisfy the claim language," (emphasis in original)). However, the Board made no finding that the delay means of claim 1 and that embodied in the Curtis device are structurally equivalent. Accordingly, its decision as to the anticipation of claim 1 is deficient and must be vacated. Since structural equivalency under *section 112* para. 6 is a question of fact, see *Pennwalt Corp. v. Durand-Wayland*, 833 F.2d 931, 933-34, 4 USPQ2d 1737, 1739 (Fed. Cir. 1987) (*in banc*), the [\*834] court will not reach that question in the first instance.<sup>4</sup>

4 In light of this disposition, the court need not resolve the question of how closely synchronized are the ring signals heard by the calling and called parties.

### III

The Board rejected claim 2, which depends from claim 1, on the ground that the use of a microcomputer to achieve the delay would have been obvious to one skilled in the art. "A [\*\*8] determination that an invention would have been obvious under § 103 is a conclusion of law based on fact. [] The degree to which the determination involves facts, and is thus subject to the 'clearly erroneous' standard . . . is that degree required to erect a foundation of facts sufficient to support the legal conclusion." *Ryco, Inc. v. Ag-Bag Corp.*, 857 F.2d 1418, 1423, 8 USPQ2d 1323, 1327 (Fed. Cir. 1988) (citations omitted). See also *In re Caveney*, 761 F.2d 671, 674, 226 USPQ 1, 3 (Fed. Cir. 1985).

Claim 2 modifies claim 1 by defining the control and delay means thereof as "comprising a microcomputer having an internal counter to delay the seizure of said telephone line until the counter reaches a predetermined count." In its opinion, the Board stated:

Curtis discloses an analog circuit for counting calls [sic, rings]. . . . Hanscom discloses that it was conventional to count calls [rings] digitally in a telephone answering machine by means of a microcomputer. . . . We hold that the artisan, having the suggestions of Curtis and Hanscom before him at the time the

invention was [\*\*9] made, would have found it manifestly obvious to combine these teachings to obtain the subject matter of claim 2.

We are convinced that this holding does not recognize that there are critical differences between the claimed invention and the prior art. See *Graham v. John Deere Co.*, 383 U.S. 1, 17-18, 148 USPQ 459, 467, 15 L. Ed. 2d 545, 86 S. Ct. 684 (1966) (the difference between the claimed invention and the prior art is one of the four factual inquiries pertinent to any obviousness inquiry under 35 U.S.C. § 103). It also does not reflect the admonition of this court that "obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching, suggestion or incentive supporting the combination." *Carella v. Starlight Archery and Pro Line Co.*, 804 F.2d 135, 140, 231 USPQ 644, 647 (Fed. Cir. 1986); see also *ACS Hosp. Sys., Inc. v. Montefiore Hosp.*, 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). The Board's analysis is a classical example [\*\*10] of a hindsight reconstruction of the claimed invention.

Bond's claimed invention includes a microcomputer which functions to delay seizure of the telephone line once the device has been set to the automatic answering mode. The Board found that the Curtis device experiences some delay after it has been energized and before it seizes the telephone line. Such a delay is only inherent in the Curtis system and Curtis neither places any importance on this delay nor specifically notes that line seizure should be further deferred. Hanscom, the secondary reference, discloses a familiar telephone answering machine that employs a microcomputer which delays seizure of the telephone line until after a preset number of rings, while using a microcomputer to count the number of incoming rings. Hanscom is silent with respect to whether a device like that disclosed by Curtis should embody a delay following activation of the answering mode and before line seizure, or how such a delay should be implemented. For the purpose of its combination with Curtis, the Hanscom patent merely discloses that microcomputers can be used as a means for counting telephone rings entering an automatic answering machine.

[\*\*11] When the claimed invention is contrasted

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with the Curtis and Hanscom devices, a distinct difference becomes apparent -- the claimed invention embodies a microcomputer placed within the system which delays seizure of the telephone line for a predetermined period of time following activation of the device's answering mode. Unless the Curtis and Hanscom disclosures would [\*835] have suggested to one of ordinary skill in the art at the time the invention was made that a microcomputer should be so employed, claim 2 is not unpatentable under 35 U.S.C. § 103 on this record. See *Uniroyal, Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 1050-51, 5 USPQ2d 1434, 1438 (Fed. Cir.) cert. denied, 488 U.S. 825, 109 S. Ct. 75, 102 L. Ed. 2d 51 (1988). On balance, we conclude, given the factual findings of the Board (including the finding that the Curtis device *does* contain some structure which is involved in producing the inherent delay in seizing the telephone line after activation of the automatic answering mode, *see* footnote 2, *supra*), that even though the Curtis device does experience some inherent delay, the cited references [\*12] would not have suggested the claimed invention to one of ordinary skill. Neither reference expressly or implicitly suggests that a microcomputer assembly should be embodied in a Curtis-like device in

such a manner as would produce the inherent, yet unmentioned, delay experienced by the Curtis device.

#### IV

In conclusion, the Board's decision is (1) vacated insofar as it holds that the invention of claim 1 of Bond's application is anticipated by the Curtis device; (2) reversed insofar as it holds that claim 2 is unpatentable under 35 U.S.C. § 103 over Curtis in view of Hanscom; and (3) remanded. On remand, the Board should consider whether the delay experienced by the Curtis device after activation of the answering mode and before seizure of the telephone line is caused by any "structure" within the Curtis device and, if so, whether this "structure" is equivalent to that disclosed in Bond's specification as exemplary of the claim 1 delay means. Only if each of these inquiries is answered in the affirmative is the invention defined in claim 1 anticipated by the Curtis disclosure.

VACATED-IN-PART, REVERSED-IN-PART, and REMANDED.

LEXSEE 527 F.2D 1226

**IN THE MATTER OF THE APPLICATION OF WILLIAM P. CLINTON, JOE W. JOHNSON, FRANKLYN W. MEYER, RICHARD A. PFLUGER, and GERALD E. JACOBS**

**Patent Appeal No. 75-587**

**UNITED STATES COURT OF CUSTOMS AND PATENT APPEALS**

*527 F.2d 1226; 1976 CCPA LEXIS 201; 188 U.S.P.Q. (BNA) 365*

**January 15, 1976, DECIDED.**

**PRIOR HISTORY:** [\*1] Serial No. 830,195.

**OPINION BY:** LANE

**OPINION**

[\*1226] LANE, Judge.

This is an appeal from the decision of the Patent and Trademark Office Board of Appeals affirming the examiner's rejection of claims 1, 3, and 5 through 9, all of the claims remaining in application serial No. 830,195, filed May 20, 1969, for an "Improved Process for Producing Aromatized Freeze-Dried Coffee." We affirm.

**Background**

The subject matter of the claims is a process of producing a stable, freeze-dried, soluble coffee. Roasted and [\*1227] ground coffee is percolated to obtain a coffee extract containing from 20% to 35% soluble coffee solids. This initial coffee extract is freeze concentrated by partial freezing to form ice crystals and concentrated coffee extract. The concentrated coffee extract, containing 35% to 55% soluble coffee solids, is separated from the ice crystals and frozen, comminuted, and dried.

The concentrated coffee extract is first cooled below its eutectic point, and the frozen extract is ground to a granular particle size.

Freeze drying the granular frozen concentrated coffee extract is generally accomplished at a condenser temperature below -30 degrees F. and a pressure [\*2] below 500 microns, until the granular frozen extract has a moisture content of between 1% and 2.5%.

Claims 1 and 8 are representative:

1. A process for preparing a granular freeze-dried coffee having a dark color which comprises percolating roasted and ground coffee to obtain a coffee extract containing 20-35% soluble solids and desired flavor and aroma values, freeze-concentrating said extract to a solids level of 35-55% by partially freezing the water in said extract as ice crystals and removing said ice crystals from the concentrated extract, cooling said concentrated extract to below its eutectic point, grinding the frozen extract to a granular particle size, and then freeze-drying said granular frozen extract to between 1 and 2.5% moisture under vacuum conditions of less than 500 microns while maintaining the product temperature of said coffee below 120 degrees F.

8. The process of claim 1 wherein the coffee extract is chilled to between 33 degrees and 45 degrees F. and held for a period sufficient to cause insoluble sediment to form in the extract and then separating said sediment from the extract prior to freeze-concentration.

The patents relied upon by the board [\*3] are:

Colton	2,751,687 June 26, 1956
Ganiaris	3,283,522 November 8, 1966 (filed Nov. 4, 1963)
Cottle et al.	3,362,178 January 9, 1968 (filed Jan. 3, 1964)
Clinton et al.	3,428,784 April 15, 1969

The board also relied on M. Sivetz, Coffee Processing Technology, 14-25 (1963).

Flosdorf discloses a process of freeze drying fruit juices and extracts such as coffee extract. The solution to be freeze dried is preconcentrated, e.g., by subjecting the material to partial freezing with the formation of a slurry of ice crystals and concentrate, and separating the concentrate from the ice crystals. The preconcentrated product is then frozen and, after freezing, subjected to a high vacuum to remove the water present and dry the product. The dried product may be granulated. If the process is carried out as a continuous process (rather than a batch process), the concentrate may be frozen and granulated prior to freeze drying.

Colton discloses a process of preserving materials such as food extracts and beverages by freezing the material, granulating the frozen material, and freeze drying the frozen granules.

Ganiaris discloses [\*\*4] a process for freeze concentrating an aqueous solution such as coffee. The aqueous solution is chilled to form a slurry of ice crystals and concentrated aqueous solution. The concentrated solution is separated from the ice crystals.

Cottle et al. disclose a process of removing sediment formed on cooling an aqueous solution. Upon cooling, an aqueous solution may form a sediment at a temperature slightly above the temperature at which ice crystals begin to form. This is disclosed to be a problem in processes of concentration by crystallization, e.g., concentrating food products and beverages by crystallization. This sediment may be removed and the solution further cooled to form a slurry of [\*1228] ice crystals and concentrated aqueous solution. The ice crystals are separated from the concentrated aqueous solution.

Clinton et al. disclose a process of freeze drying a coffee extract. The coffee extract is slowly frozen from its ice point to below its eutectic point over a period of at

least 15 minutes to develop a non-ordered distribution of dendritic ice crystals. The dendritic ice crystals are characterized by non parallel main stems, smaller extending branches from [\*\*5] said main stems, and an absence of ice crystals of non-dendritic form in the eutectic mixture located between the dendritic ice crystals. The frozen coffee extract is comminuted to obtain a granular product. This frozen granular product is vacuum freeze-dried.

The portion of the Sivetz treatise on coffee processing technology relied upon discloses that freeze concentration can produce a concentrated extract containing 50% soluble coffee solids. Although Sivetz states that (at the time of his publication) freeze concentration of coffee solids was not practiced commercially, this statement is qualified by the statement that both theoretical and practical considerations favor freeze concentration.

The examiner rejected all of the claims under 35 USC 103, either in view of the disclosure of Flosdorf considered together with Colton and Sivetz, or in view of the disclosure of Clinton et al. considered together with Ganiaris. The examiner also relied upon the disclosure of Cottle et al. in connection with the cooling and clarification steps of claims 8 and 9. The board affirmed each rejection.

#### OPINION

Appellants admit that the individual steps of freeze concentrating and freeze [\*\*6] drying a coffee extract are disclosed in the prior art, but contend that there is no suggestion in the prior art to combine these individual steps. With respect to the additional steps of cooling and clarification in claims 8 and 9, appellants admit that these steps are also generally disclosed in the prior art, but contend that it would not have been obvious to apply these procedures to remove sediment from coffee extract prior to freeze concentration. Appellants also contend that when all the prior art is considered together, one of ordinary skill in the art would not have a sufficient basis

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for the necessary predictability of success to sustain a rejection under 35 USC 103. *In re Mercier*, 515 F.2d 1161, 1167, 185 USPQ 774, 779 (CCPA 1975).

We have carefully reviewed the record and are persuaded that a person of ordinary skill in the art would have had sufficient motivation to combine the individual steps forming the claimed process. *In re Adams*, 53 CCPA 996, 1000, 356 F.2d 998, 1001-02, 148 USPQ 742, 745 (1966); *In re Bergel*, 48 CCPA 1102, 1105, 292 F.2d 955, 956-57, 130 USPQ 206, 208 (1961).

We first consider the references by themselves to see whether they suggest doing [\*\*7] what appellants have done. *In re Skoll*, 523 F.2d 1392, 187 USPQ 481 (CCPA 1975). Flosdorf alone suggests subjecting a coffee extract to a combination of freeze concentration and freeze drying. Cottle et al. disclose that freeze concentration of food products and beverages generally may result in the formation of a sediment which can be removed by cooling and clarification. Although Cottle et al. do not disclose sediment formation in coffee extract in particular, we think it would have been within the ability of a worker of ordinary skill in the art aware of Cottle et al. to subject a coffee extract to gradual cooling and to remove any resultant sediment prior to freeze concentration.

We next consider whether a person of ordinary skill in the art combining the individual steps which form the claimed process would have a sufficient basis for the required expectation of success. Obviousness does not require absolute predictability, but a reasonable expectation of success is necessary. *In re Mercier*, *supra*; *In re Naylor*, 54 CCPA 902, 369 F.2d 765, 152 USPQ 106 (1966); *In re Pantzer*, 52 CCPA 1135, 341 F.2d 121, 144 USPQ 415 (1965). Flosdorf states that the freeze-dried coffee [\*1229] [\*\*8] obtained by the disclosed process has excellent properties. Appellant argues that Sivetz discloses that some flavor is lost in freeze concentrating a coffee extract. Nothing in the Sivetz reference detracts from the clear statements in Flosdorf. Cottle et al. are concerned with preserving the original freshness and flavor of food products and beverages. We think a person of ordinary skill in the art would reasonably expect that the combination of steps suggested by the references would produce a freeze-dried coffee having desirable properties. We conclude that these references made a *prima facie* case of obviousness which appellants have failed to rebut.

Appellants also contend that the Board of Appeals has ignored certain claim limitations requiring freeze drying the coffee extract to a final moisture content between 1% and 2.5%. Appellants point to certain statements in the disclosure of their application which they allege establish that the claimed moisture content is critical. Appellants' specification states:

It is necessary to dry the coffee extract to a stable moisture level of between 1 and 2.5%. Above this moisture range, it has been found that the soluble coffee [\*\*9] product cakes and develops off-flavors upon storage. However, care should be taken not to dry the extract to a level of below 1% moisture since over-drying will cause an excess removal of aromatic materials including those which are essential to a good coffee flavor.

Absent any evidence to the contrary, we accept these statements as proof that the claimed final moisture content is critical. *Pines v. McAllister*, 38 CCPA 981, 988, 188 F.2d 388, 392, 89 USPQ 312, 315 (1951). Nevertheless we believe that a person of ordinary skill in the art would find the claimed final moisture content obvious in view of the cited references. The only detailed disclosure in Flosdorf describes freeze concentrating and freeze drying orange juice to a final moisture content of about 0.3%. In our opinion, one skilled in this art would start with 0.3% as a possible final moisture content for freeze-dried coffee. Recognizing the flavor deficiencies, the skilled artisan would tend to depart from 0.3%. The references all state that freeze drying is an expensive method of removing water. Economics alone would motivate a person of ordinary skill in the art producing a freeze-dried coffee by the Flosdorf [\*\*10] process to find the highest final moisture content consistent with the excellent properties Flosdorf describes. A person of ordinary skill in the art, having no reason to expect that the optimum final moisture content of freeze-dried coffee is the same as freeze-dried orange juice, and being motivated to permit a higher final moisture content if possible, would soon find the claimed final moisture content.

#### Conclusion

The decision of the board is affirmed.

AFFIRMED

LEXSEE 175 F.3D 994

**IN RE ANITA DEMBICZAK and BENSON ZINBARG, Appellants.**

**98-1498**

**UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT**

*175 F.3d 994; 1999 U.S. App. LEXIS 8109; 50 U.S.P.Q.2D (BNA) 1614*

**April 28, 1999, Decided**

**PRIOR HISTORY:** [\*\*1]Appealed from: Patent and Trademark Office Board of Patent Appeals and Interferences. (Serial No. 08/427,732).

**DISPOSITION:** REVERSED.

**COUNSEL:** David P. Gordon, of Stamford, Connecticut, argued for appellant. Of counsel was Thomas A. Gallagher, of Stamford, Connecticut.

John M. Whealan, Associate Solicitor, Office of the Solicitor, of Arlington, Virginia, argued for appellee. With him on the brief were Albin F. Drost, Acting Solicitor, and David R. Nicholson, Associate Solicitor.

**JUDGES:** Before MAYER, Chief Judge, MICHEL and CLEVENGER, Circuit Judges.

**OPINION BY:** CLEVENGER

**OPINION**

[\*996] CLEVENGER, *Circuit Judge.*

Anita Dembiczak and Benson Zinbarg appeal the rejection, upheld by the Board of Patent Appeals and Interferences, of all pending claims in their Application No. 08/427,732. *See Ex Parte Dembiczak*, No. 96-2648, slip op. at 43 (May 14, 1998). Because the Board erred in sustaining rejections of the pending claims as obvious under 35 U.S.C. § 103(a) (Supp. 1998), and for obviousness-type double patenting, we reverse.

I

The invention at issue in this case is, generally

speaking, a large trash bag made of orange plastic and decorated with lines and facial features, allowing the bag, when filled [\*\*2] with trash or leaves, to resemble a Halloween-style pumpkin, or jack-o'-lantern. As the inventors, Anita Dembiczak and Benson Zinbarg (collectively, "Dembiczak") note, the invention solves the long-standing problem of unsightly trash bags placed on the curbs of America, and, by fortuitous happenstance, allows users to express their whimsical or festive nature while properly storing garbage, leaves, or other household debris awaiting collection. Embodiments of the invention--sold under a variety of names, including Giant Stuff-A-Pumpkin TM, Funkins, Jack Sak TM, and Bag-O-Fun TM--have undisputedly been well-received by consumers, who bought more than seven million units in 1990 alone. Indeed, in 1990, the popularity of the pumpkin bags engendered a rash of thefts around Houston, Texas, leading some owners to resort to preventative measures, such as greasing the bags with petroleum jelly and tying them to trees. *See R. Piller, "Halloween Hopes Die on the Vine," Hous. Chron., Oct. 19, 1990, at 13A.*

The road to profits has proved much easier than the path to patentability, however. In July 1989, Dembiczak filed a utility patent application generally directed to the pumpkin bags. [\*\*3] In a February 1992 appeal, the Board of Patent Appeals and Interferences ("the Board") reversed the Examiner's rejection, but entered new grounds for rejection. Dembiczak elected to continue prosecution, filing a continuation application to address the new grounds for rejection. Thereafter, the invention made a second appearance before the Board, in April 1993, when the Board both sustained the Examiner's rejection and again entered new grounds for rejection. Again, a continuation application was filed (the instant

application). And again the Examiner's rejection was appealed to the Board, which sustained the rejection in a May 14, 1998, decision. *See Dembicczak*, slip op. at 43.

#### A

The patent application at issue includes claims directed to various embodiments of [\*997] the pumpkin bag. Claims 37, 49, 51, 52, 58 through 64, 66 through 69, and 72 through 81 are at issue in this appeal. Though the claims vary, independent claim 74 is perhaps most representative:

74. A decorative bag for use by a user with trash filling material, the bag simulating the general outer appearance of an outer surface of a pumpkin having facial indicia thereon, comprising:

a flexible waterproof plastic [\*\*4] trash or leaf bag having

an outer surface which is premanufactured orange in color for the user to simulate the general appearance of the outer skin of a pumpkin, and having

facial indicia including at least two of an eye, a nose and a mouth on the orange color outer surface for forming a face pattern on said orange color outer surface to simulate the general outer appearance of a decorative pumpkin with a face thereon,

said trash or leaf bag having first and second opposite ends, at least said second end having an opening extending substantially across the full width of said trash or leaf bag for receiving the trash filling material,

wherein when said trash or leaf bag is filled with trash filling material and closed, said trash or leaf bag takes the form and general appearance of a pumpkin with a face thereon.

All of the independent claims on appeal, namely 37, 52, 72, and 74, contain limitations that the bag must be "premanufactured orange in color," have "facial indicia,"

have openings suitable for filling with trash material, and that when filled, the bag must have a generally rounded appearance, like a pumpkin. Independent claims 37, 52, and 72 add the [\*\*5] limitation that the bag's height must at least 36 inches. Claim 72 requires that the bag be made of a "weatherproof material," and claim 74, as shown above, requires that the bag be "waterproof." Claim 52 recites a "method of assembling" a bag with the general characteristics of apparatus claim 37.

#### B

The prior art cited by the Board includes:

(1) pages 24-25 of a book entitled "A Handbook for Teachers of Elementary Art," by Holiday Art Activities ("Holiday"), describing how to teach children to make a "Crepe Paper Jack-O-Lantern" out of a strip of orange crepe paper, construction paper cut-outs in the shape of facial features, and "wadded newspapers" as filling;

(2) page 73 of a book entitled "The Everything Book for Teachers of Young Children," by Martha Shapiro and Valerie Indenbaum ("Shapiro"), describing a method of making a "paper bag pumpkin" by stuffing a bag with newspapers, painting it orange, and then painting on facial features with black paint;

(3) U.S. Patent No. 3,349,991 to Leonard Kessler, entitled "Flexible Container" ("Kessler"), describing a bag apparatus wherein the bag closure is accomplished by the use of folds or gussets in the bag material;

(4) [\*\*6] U.S. Patent No. Des. 310,023, issued August 21, 1990 to Dembicczak ("Demiciczak '023"), a design patent depicting a bag with a jack-o'-lantern face;

(5) U.S. Patent No. Des. 317,254, issued June 4, 1991 to Dembicczak ("Demiciczak '254"), a design patent depicting a bag with a jack-o'-lantern face; and,

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- (6) Prior art "conventional" plastic lawn or trash bags ("the conventional trash bags").

Using this art, the Board affirmed the Examiner's final rejection of all the independent claims (37, 52, 72, 74) under 35 U.S.C. § 103, [\*998] holding that they would have been obvious in light of the conventional trash bags in view of the Holiday and Shapiro references. The Board determined that, in its view of the prior art, "the only difference between the invention presently defined in the independent claims on appeal and the orange plastic trash bags of the prior art and the use of such bags resides in the application of the facial indicia to the outer surface of the bag." *Dembiczak*, slip op. at 18. The Board further held that the missing facial indicia elements were provided by the Holiday and Shapiro references' description of painting jack-o'-lantern faces on paper bags. See [\*7] *id.* at 18-19. Dependent claims 49 and 79, which include a "gussets" limitation, were considered obvious under similar reasoning, except that the references cited against them included Kessler. *See id.* at 7.

The Board also affirmed the Examiner's obviousness-type double patenting rejection of all the independent claims in light of the two Dembiczk design patents ('023 and '254) and Holiday. *See id.* at 12. The Board held that the design patents depict a generally rounded bag with jack-o'-lantern facial indicia, and that the Holiday reference supplies the missing limitations, such as the "thin, flexible material" of manufacture, the orange color, the initially-open upper end, and the trash filling material. The Board also stated that the various limitations of the dependent claims--e.g., color, the inclusion of leaves as stuffing, and the dimensions--would all be obvious variations of the depictions in the Dembiczk design patents. *See id.* at 8-9. In addition, using a two-way test for obviousness-type double patenting, the Board held that the claims of the Dembiczk design patents "do not exclude" the additional structural limitations of the pending utility claims, [\*8] and thus the design patents were merely obvious variations of the subject matter disclosed in the utility claims. *See id.* at 11. The Board further upheld, on similar grounds and with the inclusion of the Kessler reference, the obviousness-type double patenting rejection of dependent claim 49. *See id.* at 12.

This appeal followed, vesting this court with

jurisdiction pursuant to 28 U.S.C. § 1295(a)(4)(A) (1994).

## II

A claimed invention is unpatentable if the differences between it and the prior art "are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art." 35 U.S.C. § 103(a) (Supp. 1998); *see Graham v. John Deere Co.*, 383 U.S. 1, 14, 148 U.S.P.Q. (BNA) 459, 465, 15 L. Ed. 2d 545, 86 S. Ct. 684 (1966). The ultimate determination of whether an invention is or is not obvious is a legal conclusion based on underlying factual inquiries including: (1) the scope and content of the prior art; (2) the level of ordinary skill in the prior art; (3) the differences between the claimed invention and the prior art; and (4) objective evidence of nonobviousness. *See Graham*, 383 U.S. at 17-18, 148 U.S.P.Q. (BNA) [\*9] at 467; *Miles Labs, Inc., Inc. v. Shandon Inc.*, 997 F.2d 870, 877, 27 U.S.P.Q.2D (BNA) 1123, 1128 (Fed. Cir. 1993). We therefore review the ultimate determination of obviousness without deference to the Board, while examining any factual findings for clear error. *See, e.g., In re Zurko*, 142 F.3d 1447, 1459, 46 U.S.P.Q.2D (BNA) 1691, 1700 (Fed. Cir.) (en banc), cert. granted, 119 S. Ct. 401 (1998).

### A

Our analysis begins in the text of *section 103* quoted above, with the phrase "at the time the invention was made." For it is this phrase that guards against entry into the "tempting but forbidden zone of hindsight," *see Loctite Corp. v. Ultraseal Ltd.*, 781 F.2d 861, 873, 228 U.S.P.Q. (BNA) 90, 98 (Fed. Cir. 1985), overruled on other grounds by *Nobelpharma AB v. Implant Innovations, Inc.*, 141 F.3d 1059, 46 U.S.P.Q.2D (BNA) 1097 [\*999] (Fed. Cir. 1998), when analyzing the patentability of claims pursuant to that section. Measuring a claimed invention against the standard established by *section 103* requires the oft-difficult but critical step of casting the mind back to the time of invention, to consider the thinking of one of ordinary skill in the art, guided only by the prior art references and the then-accepted [\*10] wisdom in the field. *See, e.g., W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1553, 220 U.S.P.Q. (BNA) 303, 313 (Fed. Cir. 1983). Close adherence to this methodology is especially important in the case of less technologically complex inventions, where the very ease with which the invention can be understood may prompt one "to fall victim to the

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insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher." *Id.*

Our case law makes clear that the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references. *See, e.g., C.R. Bard, Inc. v. M3 Sys., Inc.*, 157 F.3d 1340, 1352, 48 U.S.P.Q.2D (BNA) 1225, 1232 (Fed. Cir. 1998) (describing "teaching or suggestion or motivation [to combine]" as an "essential evidentiary component of an obviousness holding"); *In re Rouffet*, 149 F.3d 1350, 1359, 47 U.S.P.Q.2D (BNA) 1453, 1459 (Fed. Cir. 1998) ("the Board must identify specifically . . . the reasons one of ordinary skill in the art would have been motivated to select [\*\*11] the references and combine them"); *In re Fritch*, 972 F.2d 1260, 1265, 23 U.S.P.Q.2D (BNA) 1780, 1783 (Fed. Cir. 1992) (examiner can satisfy burden of obviousness in light of combination "only by showing some objective teaching [leading to the combination]"); *In re Fine*, 837 F.2d 1071, 1075, 5 U.S.P.Q.2D (BNA) 1596, 1600 (Fed. Cir. 1988) (evidence of teaching or suggestion "essential" to avoid hindsight); *Ashland Oil, Inc. v. Delta Resins & Refractories, Inc.*, 776 F.2d 281, 297, 227 U.S.P.Q. (BNA) 657, 667 (Fed. Cir. 1985) (district court's conclusion of obviousness was error when it "did not elucidate any factual teachings, suggestions or incentives from this prior art that showed the propriety of combination"). *See also Graham*, 383 U.S. at 18, 148 U.S.P.Q. (BNA) at 467 ("strict observance" of factual predicates to obviousness conclusion required). Combining prior art references without evidence of such a suggestion, teaching, or motivation simply takes the inventor's disclosure as a blueprint for piecing together the prior art to defeat patentability--the essence of hindsight. *See, e.g., Interconnect Planning Corp. v. Feil*, 774 F.2d 1132, 1138, 227 U.S.P.Q. (BNA) 543, 547 (Fed. Cir. 1985) ("The invention [\*\*12] must be viewed not with the blueprint drawn by the inventor, but in the state of the art that existed at the time."). In this case, the Board fell into the hindsight trap.

We have noted that evidence of a suggestion, teaching, or motivation to combine may flow from the prior art references themselves, the knowledge of one of ordinary skill in the art, or, in some cases, from the nature of the problem to be solved, *see Pro-Mold & Tool Co. v. Great Lakes Plastics, Inc.*, 75 F.3d 1568, 1573, 37

U.S.P.Q.2D (BNA) 1626, 1630 (Fed. Cir. 1996), *Para-Ordnance Mfg. v. SGS Imports Intern., Inc.*, 73 F.3d 1085, 1088, 37 U.S.P.Q.2D (BNA) 1237, 1240 (Fed. Cir. 1995), although "the suggestion more often comes from the teachings of the pertinent references," *Rouffet*, 149 F.3d at 1355, 47 U.S.P.Q.2D (BNA) at 1456. The range of sources available, however, does not diminish the requirement for actual evidence. That is, the showing must be clear and particular. *See, e.g., C.R. Bard*, 157 F.3d 1340 at 1352, 48 U.S.P.Q.2D (BNA) at 1232. Broad conclusory statements regarding the teaching of multiple references, standing alone, are not "evidence." *E.g., McElmurry v. Arkansas Power & Light Co.*, 995 F.2d 1576, 1578, 27 U.S.P.Q.2D (BNA) [\*\*13] 1129, 1131 (Fed. Cir. 1993) ("Mere denials and conclusory statements, however, are not sufficient to establish a genuine issue of [\*1000] material fact."); *In re Sichert*, 566 F.2d 1154, 1164, 196 U.S.P.Q. (BNA) 209, 217 (CCPA 1977) ("The examiner's conclusory statement that the specification does not teach the best mode of using the invention is unaccompanied by evidence or reasoning and is entirely inadequate to support the rejection."). In addition to demonstrating the propriety of an obviousness analysis, particular factual findings regarding the suggestion, teaching, or motivation to combine serve a number of important purposes, including: (1) clear explication of the position adopted by the Examiner and the Board; (2) identification of the factual disputes, if any, between the applicant and the Board; and (3) facilitation of review on appeal. Here, however, the Board did not make particular findings regarding the locus of the suggestion, teaching, or motivation to combine the prior art references.

All the obviousness rejections affirmed by the Board resulted from a combination of prior art references, *e.g.*, the conventional trash or yard bags, and the Holiday and Shapiro publications teaching [\*\*14] the construction of decorated paper bags. *See Dembicak*, slip op. at 6-7. To justify this combination, the Board simply stated that "the Holiday and Shapiro references would have suggested the application of . . . facial indicia to the prior art plastic trash bags." *Id.* at 18-19. However, rather than pointing to specific information in Holiday or Shapiro that suggest the combination with the conventional bags, the Board instead described in detail the similarities between the Holiday and Shapiro references and the claimed invention, noting that one reference or the other--in combination with each other and the conventional trash bags--described all of the limitations of the pending

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claims. *See id.* at 18-28. Nowhere does the Board particularly identify any suggestion, teaching, or motivation to combine the children's art references (Holiday and Shapiro) with the conventional trash or lawn bag references, nor does the Board make specific--or even inferential--findings concerning the identification of the relevant art, the level of ordinary skill in the art, the nature of the problem to be solved, or any other factual findings that might serve to support a proper obviousness [\*\*15] analysis. *See, e.g., Pro-Mold & Tool*, 75 F.3d at 1573, 37 U.S.P.Q.2D (BNA) at 1630.

To the contrary, the obviousness analysis in the Board's decision is limited to a discussion of the ways that the multiple prior art references can be combined to read on the claimed invention. For example, the Board finds that the Holiday bag reference depicts a "premanufactured orange" bag material, *see Dembicak*, slip op. at 21, finds that Shapiro teaches the use of paper bags in various sizes, including "large", *see id.* at 22-23, and concludes that the substitution of orange plastic for the crepe paper of Holiday and the paper bags of Shapiro would be an obvious design choice, *see id.* at 24. Yet this reference-by-reference, limitation-by-limitation analysis fails to demonstrate how the Holiday and Shapiro references teach or suggest their combination with the conventional trash or lawn bags to yield the claimed invention. *See Rouffet*, 149 F.3d at 1357, 47 U.S.P.Q.2D (BNA) at 1459 (noting Board's failure to explain, when analyzing the prior art, "what specific understanding or technical principle . . . would have suggested the combination"). Because we do not discern any finding by [\*\*16] the Board that there was a suggestion, teaching, or motivation to combine the prior art references cited against the pending claims, the Board's conclusion of obviousness, as a matter of law, cannot stand. *See C.R. Bard*, 157 F.3d at 1352, 48 U.S.P.Q.2D (BNA) at 1232; *Rouffet*, 149 F.3d at 1359, 47 U.S.P.Q.2D (BNA) at 1459; *Fritch*, 972 F.2d at 1265, 23 U.S.P.Q.2D (BNA) at 1783; *Fine*, 837 F.2d at 1075, 5 U.S.P.Q.2D (BNA) at 1600; *Ashland Oil*, 776 F.2d at 297, 227 U.S.P.Q. (BNA) at 667.

## B

The Commissioner of Patents and Trademarks ("Commissioner") attempts to justify the Board's decision on grounds [\*1001] different from that relied upon by the Board, arguing that one of ordinary skill in the art would have been motivated to combine the references. Of

course, in order to do so, the Commissioner must do what the Board did not do below: make specific findings of fact regarding the level of skill in the art ("a designer and manufacturer of trash and leaf bags, particularly one specializing in the ornamental and graphic design of such bags"), *Resp't Br.* at 14, the relationship between the fields of conventional trash bags and children's crafts, respectively ("the artisan would also have been well aware of the ancillary, [\*\*17] corollary, and atypical uses of 'trash' bags such as their application in hobby and art projects"), *Resp't Br.* at 15, and the particular features of the prior art references that would motivate one of ordinary skill in a particular art to select elements disclosed in references from a wholly different field ("a designer and manufacturer of trash and leaf bags would have recognized the paper bag in Shapiro to be a trash bag and therefore would have been motivated to combine it with the admitted prior art plastic trash and leaf bags to arrive at the claimed invention"), *Resp't Br.* at 15. The Commissioner also appears to cite additional references in support of his obviousness analysis, noting that at least two design patents (in the record but not cited against the presently pending claims) teach the placement of "graphical information, including text, designs, and even facial indicia, to colored bags." *Resp't Br.* at 16. This new analysis, apparently cut from whole cloth in view of appeal, does little more than highlight the shortcomings of the decision below, and we decline to consider it. *See, e.g., In re Robertson*, 1999 U.S. App. LEXIS 3224, 169 F.3d 743, 746, [\*\*18] 49 U.S.P.Q.2D (BNA) 1949, 1951 (Fed. Cir. 1999) ("We decline to consider [the Commissioner's] newly-minted theory as an alternative ground for upholding the agency's decision."); *In re Soni*, 54 F.3d 746, 751, 34 U.S.P.Q.2D (BNA) 1684, 1688 (Fed. Cir. 1995); *In re Hounsfield*, 699 F.2d 1320, 1324, 216 U.S.P.Q. (BNA) 1045, 1049 (Fed. Cir. 1983) (rejecting an "attempt[] by the Commissioner 'to apply a new rationale to support the rejection.'"); *see also* 35 U.S.C. § 144 (1994) (an appeal to the Federal Circuit "is taken on the record before The Patent and Trademark Office"). Because the Board has not established a *prima facie* case of obviousness, *see In re Bell*, 991 F.2d 781, 783, 26 U.S.P.Q.2D (BNA) 1529, 1531 (Fed. Cir. 1993) ("The PTO bears the burden of establishing a case of *prima facie* obviousness."), we therefore reverse the obviousness rejections, and have no need to address the parties' arguments with respect to secondary factors.

## III

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Dembiczak also asks this court to reverse the Board's rejection of the pending claims for obviousness-type double patenting, which is a judicially-created doctrine that seeks to prevent the applicant from expanding the grant of the patent right beyond the [\*\*19] limits prescribed in Title 35. *See, e.g., In re Braat*, 937 F.2d 589, 592, 19 U.S.P.Q.2D (BNA) 1289, 1291-92 (Fed. Cir. 1991); *In re Longi*, 759 F.2d 887, 892, 225 U.S.P.Q. (BNA) 645, 648 (Fed. Cir. 1985). *See also* 35 U.S.C. § 154(a)(2) (Supp. 1998) (discussing patent term). The doctrine prohibits claims in a second patent which define "merely an obvious variation" of an invention claimed by the same inventor in an earlier patent. *Braat*, 937 F.2d at 592, 19 U.S.P.Q.2D (BNA) at 1292 (quoting *In re Vogel*, 57 C.C.P.A. 920, 422 F.2d 438, 441, 164 U.S.P.Q. (BNA) 619, 622 (CCPA 1970)). Thus, unless a claim sought in the later patent is patentably distinct from the claims in an earlier patent, the claim must be rejected. *See In re Goodman*, 11 F.3d 1046, 1052, 29 U.S.P.Q.2D (BNA) 2010, 2015 (Fed. Cir. 1993); *Vogel*, 422 F.2d at 441, 164 U.S.P.Q. (BNA) at 622. This question is one of law, which we review *de novo*. *See Goodman*, 11 F.3d at 1052, 29 U.S.P.Q.2D (BNA) at 2015; *Texas Instruments Inc. v. United States Int'l Trade Comm'n*, 988 F.2d 1165, 1179, 26 U.S.P.Q.2D (BNA) 1018, 1029 (Fed. Cir. 1993).

#### [\*1002] A

The law provides that, in some very rare cases, obvious-type double patenting may be found between design and utility patents. [\*\*20] *See Carman Indus., Inc. v. Wahl*, 724 F.2d 932, 939-40, 220 U.S.P.Q. (BNA) 481, 487 (Fed. Cir. 1983) (noting that, while theoretically possible, "double patenting is rare in the context of utility versus design patents"); *In re Thorington*, 57 C.C.P.A. 759, 418 F.2d 528, 536-37, 163 U.S.P.Q. (BNA) 644, 650 (CCPA 1969) (Double patenting between a design and utility patent is possible "if the features producing the novel aesthetic effect of a design patent or application are the same as those recited in the claims of a utility patent or application as producing a novel structure."); *In re Phelan*, 40 C.C.P.A. 1023, 205 F.2d 183, 98 U.S.P.Q. (BNA) 156 (CCPA 1953); *In re Barber*, 23 C.C.P.A. 834, 81 F.2d 231, 28 U.S.P.Q. (BNA) 187 (CCPA 1936); *In re Hargraves*, 19 C.C.P.A. 784, 53 F.2d 900, 11 U.S.P.Q. (BNA) 240 (CCPA 1931). In these cases, a "two-way" test is applicable. *See Carman*, 724 F.2d at 940, 220 U.S.P.Q. (BNA) at 487. Under this test, the obviousness-type double patenting rejection is appropriate only if the claims of the two patents cross-read, meaning that "the

test is whether the subject matter of the claims of the patent sought to be invalidated would have been obvious from the subject matter of the claims of the [\*\*21] other patent, and vice versa." *Id.*, 220 U.S.P.Q. (BNA) at 487. *See also Braat*, 937 F.2d at 593, 19 U.S.P.Q.2D (BNA) at 1292 (explaining two-way test).

#### B

In making its double patenting rejection, the Board concluded that all but one of the pending claims of Dembiczk's utility application would have been merely an obvious variation of the claims of the earlier-issued design patents—the Dembiczk '023 and '254 references—in light of the Holiday reference. The remaining claim, dependent claim 49, was judged obvious in light of the combination of the Dembiczk design patents, Holiday, and the Kessler reference.

Acknowledging that the two-way test was required by *Carman*, 724 F.2d at 940, 220 U.S.P.Q. (BNA) at 487, the Board concluded that "the design claimed in each of appellants' design patents does not exclude the features pertaining to the construction and color of the bag, the use of a plastic material for making the bag, the size or thickness of the bag . . . or the use of various types of filling material . . . . The particular details of the facial indicia would have been a matter of design choice as evidenced by the Holiday handbook," and that therefore, in view of Holiday, the claims of the [\*\*22] design patents were obvious variants of the pending utility patent claims. *See Dembiczk*, slip op. at 11. We disagree. In order for a design to be unpatentable because of obviousness, there must first be a basic design reference in the prior art, the design characteristics of which are "basically the same as the claimed design." *In re Borden*, 90 F.3d 1570, 1574, 39 U.S.P.Q.2D (BNA) 1524, 1526 (Fed. Cir. 1996); *In re Rosen*, 673 F.2d 388, 391, 213 U.S.P.Q. (BNA) 347, 350 (CCPA 1982). The phrase "having facial indicia thereon" found in the claims of the pending utility application is not a design reference that is "basically the same as the claimed design." *Borden*, 90 F.3d at 1574, 39 U.S.P.Q.2D (BNA) at 1526. In fact, it describes precious little with respect to design characteristics. The Board's suggestion that the design details were simply "a matter of design choice" evinces a misapprehension of the subject matter of design patents. E.g., *Carman*, 724 F.2d at 939 n.13, 220 U.S.P.Q. (BNA) at 486 n.13 ("Utility patents afford protection for the mechanical structure and function of an invention

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whereas design patent protection concerns the ornamental or aesthetic features of a design.") Indeed, we note [\*\*23] that the two design patents at issue here--the Dembiczak '023 and '254 patents--were considered nonobvious over each other, and were even the subject of a restriction requirement. *See 35 U.S.C. § 121 (1994)* ("If two or more independent and distinct inventions are claimed in one [\*1003] application, the Commissioner may require the application to be restricted to one of the inventions."); 37 C.F.R. § 1.142. The position adopted by the Board--that a textual description of facial indicia found in the claims of the utility patent application makes obvious the specific designs claimed in the (patentably distinct) Dembiczak design patents--would presumably render obvious, or even anticipate, all design patents where a face was depicted on a bag. But this, of course, is not the law; the textual description cannot be said to be a reference "basically the same as the claimed design," of the design patents at issue here. *Borden*, 90 F.3d at 1574, 39 U.S.P.Q.2D (BNA) at 1526 (internal quotation marks omitted). The Board's conclusion of obviousness is incorrect.

Because we find that the Board erred in concluding that the design patents were obvious variants of the pending utility claims, we need not address [\*\*24] the other prong of the two-way double patenting test--whether the pending utility claims are obvious variations of the subject matter claimed in the design patents. *See Carman*, 724 F.2d at 939, 220 U.S.P.Q. (BNA) at 487 (both prongs of the two-way test required for obviousness-type double patenting). The double patenting rejections are reversed.

#### IV

Because there is no evidence in the record of a suggestion, teaching, or motivation to combine the prior art references asserted against the pending claims, the obviousness rejections are reversed. In addition, because the Board misapprehended the test for obviousness-type double patenting, and because the pending utility claims do not render obvious the design patents, the double patenting rejections are also reversed.

*REVERSED*

LEXSEE 535 F.2D 67

**IN THE MATTER OF THE APPLICATION OF MAMORU HIRAO and  
YOSHINORI SATO**

**Patent Appeal No. 76-560**

**UNITED STATES COURT OF CUSTOMS AND PATENT APPEALS**

**535 F.2d 67; 1976 CCPA LEXIS 162; 190 U.S.P.Q. (BNA) 15**

**May 27, 1976, DECIDED.**

**PRIOR HISTORY:** [\*\*1] Serial No. 839,689.

[\*] and purifying [\*\*2] and drying to obtain high purity maltose in crystalline powder form of 90 - 95% maltose; and then

**OPINION BY: MILLER**

[3] adding said high purity crystalline maltose powder to foods and drinks as the essential added sweetener.

**OPINION**

[\*67] MILLER, Judge.

This appeal is from the decision of the Patent and Trademark Office Board of Appeals affirming the rejection of claims 1-4, 10, 17-19, 21, 22, and 24-26 in application serial No. 839,689, filed July 7, 1969, for "Process for Preparing Food and Drinks." We reverse.

**The Invention**

The invention involves a process of sweetening foods and drinks. The process comprises three steps, the first two being a method of forming a high purity maltose product (which is the sweetening agent) and the third being the use of this product to sweeten the food or drink. Claim 1, the sole independent claim, is illustrative (paragraphing and numbering added):

1. A process for preparing foods and drinks sweetened mildly, and protected against discoloration, Strecker's reaction, and moisture absorption, which comprises:

[1] adding [\*] and [\*] under such conditions and in a quantity sufficient to produce straight chain amylose, to enzymatically liquefied starch which consists essentially of [\*68] amylopectin thereby producing straight-chain amylose;

[2] subjecting the resulting amylose to the action of

**The Board's Opinion**

The board, in a new ground of rejection under 37 CFR 1.196(b), found that all of the claims now before the court would have been obvious under 35 USC 103 in view of Jacobs (Jacobs, Chemistry and Technology of Food and Food Products 67-70 (1951)) together with Kjolberg (Kjolberg et al., Studies on Carbohydrate Metabolizing Enzymes, 86 J. BIOCHEMISTRY 258-62 (1963)). (The references are discussed infra under "Agreed Statement." ) The board stated:

We wish to make it clear that while appellants' method of making high purity maltose appears to be unobvious based on the art of record before us, the method of sweetening food products with high purity maltose would be obvious from the teaching of Jacobs in view of Kjolberg.

In response to a request for reconsideration, the board further stated:

We note that appellants concede that the method of sweetening food products with high purity maltose would be obvious from the teachings of Jacobs in view of [\*\*3] Kjolberg et al. As to claim 1, it is our considered opinion that, regardless of the process employed in preparing high purity maltose, it is obvious to use such high purity

maltose in sweetening food products.

#### Agreed Statement

This appeal comes before the court on an agreed statement of the case<sup>1</sup> under court Rule 5.5.<sup>2</sup> The following facts, among others, have been stipulated:

1 See *In re Hirao*, 525 F.2d 1066, 188 USPQ 248 (CCPA 1975).

2 Rule 5.5:

When the questions presented by an appeal to this court can be determined without an examination of all the pleadings, evidence, and proceedings below, the parties may submit an agreed statement of the case in lieu of the record as required by Rule 3.3(b) showing: (1) how the questions arose and were decided in the tribunal from which the appeal is taken; (2) the facts averred and proved or sought to be proved which are essential to a decision of the questions by this court; and (3) a concise statement of the issues to be decided and the points to be relied on by appellant. The statement shall be accompanied by a certified copy of the judgment or ruling appealed from and a certified copy of all opinions, if any, in support thereof.

[\*\*4] 9. Claim 1 is an independent claim on which each of the remaining appealed claims depends, directly or indirectly.

10. The rejection of dependent claims 2 to 4, 10, 17 to 19, 21, 22 and 24 to 26 will stand or fall with the rejection of claim 1.

11. The sole issue to be decided by the present appeal is whether claim 1, and all those claims dependent therefrom, are obvious in the sense of 35 USC 103 over Jacobs in view of Kjolberg.

....

13. The Kjolberg reference teaches one process of making high purity maltose.

14. The Jacobs reference generally teaches that certain undefined maltose products may be used for sweetening food products.

15. Appellants' steps of making high purity maltose,

which appear as the first two steps in claim 1 ..., are novel and unobvious based on the art of record.

16. Appellants' step of adding high purity maltose to foods and drinks as the essential added sweetener, which appears as the third step in claim 1, ... would be obvious from the teachings of Jacobs in view of Kjolberg.

#### OPINION

As stipulated, the first two steps (forming high purity maltose) would have been unobvious from the art of record, while the [\*69] third [\*\*5] step (using high purity maltose as a sweetener) would have been obvious in view of Jacobs together with Kjolberg. Moreover, the Solicitor has stated - without contravention by appellants - that the high purity maltose product formed by the first two steps and the high purity maltose product of the prior art "may be considered the same as far as the process and use recited in the preamble and step [3] of claim 1 are concerned." Thus, the single issue is whether appellants' three-step process is obvious, the first two steps being unobvious but forming a known product, and the third step being the use of this known product in an obvious way. We conclude that due to the admitted unobviousness of the first two steps of the claimed combination of steps, the subject matter as a whole would not have been obvious to one of ordinary skill in the art at the time the invention was made. Cf. *In re Mancy*, 499 F.2d 1289, 182 USPQ 303 (CCPA 1974); *In re Kuehl*, 475 F.2d 658, 177 USPQ 250 (CCPA 1973).

The Solicitor argues that Kuehl and its progeny (including Mancy ) are distinguishable, "inasmuch as the Court was there concerned with the obviousness of processes of using unobvious products," [\*6] while here "the person of ordinary skill in the art has already been given the obvious, high purity maltose produced by other processes." However, this factual distinction does not preclude the applicability to the present case of the reasoning of Kuehl, where this court said (*supra* at 664-65, 117 USPQ at 255):

[We] think [*In re Saunders*, 33 CCPA 1001, 154 F.2d 693, 69 USPQ 341 (1946)] no longer represents viable law to the extent that it supports the broad proposition that the obviousness of process claims drawn to a method of using a composition is determined by asking ... whether "given" the composition the claimed process of use would be obvious. The test under § 103 is whether in view of the prior art the invention as a whole

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would have been obvious at the time it was made, and the prior art here does not include the zeolite [the unobvious composition used] .... [Footnote omitted.]

Similarly here, it is improper to determine obviousness by merely asking whether, given the product of the two unobvious claimed steps, the third claimed step of using the product would have been obvious. The obviousness of the invention as a whole must be determined, and the unobvious [\*\*7] first two steps are clearly part of the invention as a whole.

The Solicitor urges that the board committed no error in refusing to give weight to the specific method of making the high purity maltose. He analogizes the present claims to product-by-process claims, stating that "claim 1 may properly be viewed in short hand [sic] form as a 'process of using a product-by-process' claim," and argues that the method limitations of the first two steps should be given little or no weight. A product-by-process claim, although reciting the subject matter of the claim in terms of how it is made, is still a product claim. As this court said in *In re Brown*, 59 CCPA 1036, 1041, 459 F.2d 531, 535, 173 USPQ 685, 688 (1972):

[In] spite of the fact that the claim may recite only process limitations, it is the patentability of the Product claimed and not of the recited process steps which must be established.

Here, a three-step process is claimed - not the product formed by two steps of the process or the third step of using that product. Thus, the analogy to product-by-process claims is inapposite.<sup>3</sup>

3 At oral hearing, the Solicitor pointed out that some courts in infringement suits have construed

product-by-process claims as covering only a product made by the particular process set forth in the claims (see *In re Bridgeford*, 53 CCPA 1182, 1186 n.5, 357 F.2d 679, 682 n.5, 149 USPQ 55, 58 n.5 (1966)), and argued that these courts would treat the "process of using a product-by-process claim" and the present claims in the same manner. This court, however, as recognized by the Solicitor, does not construe product-by-process claims in an ex parte case as limited to the product formed by the specific process recited. *In re Avery*, 518 F.2d 1228, 186 USPQ 161 (CCPA 1975). If it did, the Solicitor's analogy to product-by-process claims would fall under its own weight.

[\*\*8] [\*70] The Solicitor points to the preamble of claim 1, which recites a "process for preparing foods and drinks sweetened mildly," as showing that the subject matter as a whole involves the use of an old sweetening agent in a very obvious manner. However, the preamble merely recites the purpose of the process; the remainder of the claim (the three process steps) does not depend on the preamble for completeness, and the process steps are able to stand alone. See *Kropa v. Robie*, 38 CCPA 858, 187 F.2d 150, 88 USPQ 478 (1951). The Solicitor's interpretation of the preamble would improperly broaden the scope of the claim.

In view of the foregoing, we hold that the subject matter as a whole would not have been obvious at the time the invention was made.

The decision of the board is reversed.

REVERSED

LEXSEE 441 F.3D 977

**IN RE LEONARD R. KAHN**

**04-1616 (Serial No. 08/773,282)**

**UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT**

*441 F.3d 977; 2006 U.S. App. LEXIS 7070; 78 U.S.P.Q.2D (BNA) 1329*

**March 22, 2006, Decided**

**SUBSEQUENT HISTORY:** Rehearing denied by, Rehearing, en banc, denied by *In re Kahn*, 2006 U.S. App. LEXIS 14563 (Fed. Cir., June 1, 2006)

**PRIOR HISTORY:** [\*\*1]Appealed from: United States Patent and Trademark Office, Board of Patent Appeals and Interferences.

*In re Kahn*, 147 Fed. Appx. 187, 2005 U.S. App. LEXIS 23087 (2005)

**COUNSEL:** Leonard R. Kahn, Pro se, of New York, New York.

John M. Whealan, Solicitor, Office of the Solicitor, United States Patent and Trademark Office, of Arlington, Virginia, for the Director of the United States Patent and Trademark Office. With him on the brief were Linda Moncys Isacson and Raymond T. Chen, Associate Solicitors. Of counsel was Mary L. Kelly.

**JUDGES:** Before MICHEL, Chief Judge, LINN, and PROST, Circuit Judges.

**OPINION BY:** Linn

**OPINION**

[\*980] LINN, *Circuit Judge*.

Leonard R. Kahn ("Kahn") appeals from the final decision of the Board of Patent Appeals and Interferences ("Board") concluding that claims 1-20 in patent application number 08/773,282 ("the '282 application") are unpatentable as obvious under 35 U.S.C. § 103.<sup>1</sup> Because the factual findings underlying the Board's conclusion are supported by substantial evidence, and

because the Board did not commit legal error in concluding that the claims would have been obvious, we affirm.

1 The Board also affirmed its own rejection of claims 21 and 22 as being non-enabled under 35 U.S.C. § 112, P1; however, in his opening brief on appeal Kahn withdrew those claims, leaving only claims 1-20 before us.

[\*\*2] I. BACKGROUND

A. The Invention

The '282 application, filed on December 24, 1996 as a continuation-in-part of a series of continuing applications dating back to 1989, involves a "reading machine" that may be used by the blind. Prior to the application, machines that employed memory and display components by which material could be "read" using hand-held optical pens and speech synthesizers were known in the art. While a user can control these devices by hand to repeat words and to read at various speeds, such control is cumbersome, which makes it difficult for a blind user to study complex publications. Kahn addressed this problem and claims invention in a device that is operated by eye control and sound localization such that it can read out loud the word "looked at" by the user.

Kahn treats claims 1-20 as a group with claim 1 being representative:

1. A reading machine suitable for use by totally blind individuals for reading the complete text, or a selected portion thereof, of a document stored in storage

means, at the option of the user, comprising:

(a) means of storing at least a portion of the text of the document to be read,

(b) means for retrieving a selected [\*\*3] portion of said stored text made available for immediate "reading,"

(c) means for producing an acoustical display of the selected portion of said stored text, in a page-like format,

(d) means for determining the location on the acoustical display towards which the user is "looking," and

(e) means for generating speech sounds verbalizing the word that is formatted to appear on the acoustical display at the location the user is "looking" towards.

A preferred embodiment of the '282 patent is illustrated below in Figure 1.

[SEE FIG. 1 IN ORIGINAL]

[\*981] In operation,

the information being "read" . . . is fed through intermediate storage means to speech synthesizer means for converting the written information to electrical waves representing speech sounds. These electric waves are fed to . . . a four speaker array wherein the speakers are located in a fashion so that the artificial sound image can be placed at various points on the artificial screen or page allowing the user to hear the words at the desired locations. These locations would be selected by the user looking at a specific location on the artificial screen or page.

The user would then move his or her [\*\*4] eyes to "look" where the next word would be expected to appear, i.e., directly to the right of the spoken word. This would then cause the next word to be

"spoken" and the sound image would appear slightly to the right. This motion is achieved by energizing the four speaker array with different levels of audio power.

...

When the user completes the "reading" of the last word on the page, . . . the reader would have the option of rereading a section on the page or causing the page to be "turned." If the user wishes to reread . . . , he can direct his attention to the material to be reread by "looking" at the portion of the page where he remembers hearing the material.

On the other hand, if he wishes to continue reading the material he can turn the page by looking along the bottom line past the right hand edge of the "page". The first word on the new page would be heard when the reader directed his or her attention to the upper left hand corner of the page where the first word on the new page would be expected.

'282 application at 11-13.

According to the specification, the device can employ a conventional scanner to input data; a conventional character recognition device [\*\*5] to translate and send data to a storage device; and a page generator to take data from the storage device and format it for a visual display and for a word selector, the latter of which can send the data to a conventional speech synthesizer. After an optical sensor detects where a user is "looking" and a word is "selected" for vocalization, the synthesizer feeds an audio signal to a localizer control. [\*982] Loud speakers are arranged at the corners of the "page" to allow the user to confirm localization of sound. The specification further indicates that

there are a number of devices available for sensing where an individual is looking. For example, *Garwin et. al. 4,595,990* . . . , *Anderson et. al. 4,579,533* . . . and *Stanton 4,322,744* . . . . More specifically, Anderson's [sic] patent discusses feed-back which may be visual, auditory or tactile to verify decisions by eye control

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equipment.

However, such inventions are not suitable for totally blind individuals who are not verifying where they are looking but are using their eyes to direct which part of the artificial page should be read to produce a sound image. This makes essential a two dimensional stereo sound stage which the blind [\*\*6] person solely depends upon.

'282 application at 16.

#### B. The Prior Art

The Board's rejection was based on Garwin et al., *U.S. Patent No. 4,595,990* (issued June 17, 1986) ("Garwin"), in view of Anderson et al., *U.S. Patent No. 4,406,626* (issued Sept. 27, 1983) ("Anderson '626"), Anderson et al., *U.S. Patent No. 4,579,533* (issued April 1, 1986) ("Anderson '533"), and Stanton, *U.S. Patent No. 4,322,744* (issued March 30, 1982) ("Stanton"). The Board alternatively used *Anderson '626* or '*533* as primary references.

Garwin discloses an eye-controlled interactive information processor that senses the portion of a visual display at which the user is looking. The processor is connected to the display, which, in turn, can be partitioned so that different information is displayed in discrete areas. By gazing in different directions, the user informs the processor of the displayed item that is selected. *Garwin*, col. 2, ll. 60-68. The preferred embodiment employs a reflected light eye-tracking device to determine where the user is looking. *Id.*, col. 3, l. 66-col. 4, l. 62. The eye-interactive control generally uses a technique where the user is presented with a number of targets having [\*\*7] some meaning, such as "words or phrases" displayed on screen. *Id.*, col. 9, ll. 62-67. "Visual, auditory or tactile" feedback is then given to the user to indicate that a selection has been received. *Id.*, col. 2, ll. 10-11; col. 11, ll. 59-64. The user then can verify or cancel the selection. *Id.*, col. 10, ll. 1-6. Garwin states that "it will be apparent to one skilled in the art that . . . the benefits of the invention will be achieved by many types of apparatus." *Id.*, col. 2, ll. 50-53. It can be used for "requesting display of a page of text from a . . . table of contents," *id.*, col. 3, ll. 42-44, or "[other] presentation of textual material," *id.*, col. 10, ll. 31-33.

*Anderson '626* discloses an interactive "electronic teaching aid" which enables a user viewing text on a display to designate any words or portion of text for immediate audible vocalization. *Anderson '626*, col. 1, l. 8; col. 2, ll. 11-17. The components include: a selector switch, which when in the "text" position, causes data to be transmitted to a monitor and displayed in legible form, *id.*, col. 3, ll. 27-31; an advance button, which when depressed allows the user to select and retrieve [\*\*8] the next page of text from memory, *id.*, col. 3, ll. 31-41; a memory, which can store each word of the text coded for speech, *id.*, col. 3, l. 66-col. 4, l. 6; and a word designator light pen, which the user can place on a word to hear the word vocalized through the speaker, *id.*, col. 3, ll. 54-68; col. 10, ll. 51-58. *Anderson '533* discloses an improved microprocessor-based version of *Anderson '626*. *Anderson '533*, col. 1, ll. 19-24, 41-56.

[\*983] Stanton discloses an acoustical imaging system for use by visually impaired individuals that uses horizontal and vertical directional sound to represent visual aspects of an environment. Stanton states that a user can locate "the position of a virtual sound source as representing a point in space" such that different signals may represent different directions. *Stanton*, col. 1, ll. 58-61. The preferred embodiment features four loud speakers or transducers mounted at the corners of a vertical display panel. *Id.*, col. 2, ll. 54-55. When the user moves the cursor, the sound emanating from the speakers is phase shifted to produce a virtual sound seeming to come from a particular location related to the position of the cursor. *Id.*, col. [\*\*9] 1, l. 66-col. 2, l. 2; col. 2, ll. 55-63. In another embodiment, a quadraphonic headset is used in place of the transducers to achieve the effect of producing a virtual sound identifying a position. *Id.*, col. 4, ll. 26-35. Stanton states that the device may be used as a "rudimentary reading device." *Id.*, col. 1, ll. 62.

#### C. The Board Decisions

Kahn filed the '282 application with 22 claims as a continuation-in-part of application number 07/645,102 ("the '102 application"), which was filed in 1991. The '102 application was a continuation-in-part of a series of abandoned continuing applications dating back to application number 07/338,597, which was filed in 1989. While claims 21 and 22 of the '282 application are not at issue in this appeal, the Board addressed those claims on several occasions, which led to the creation of a substantial Board history. As a result, the final decision

with respect to the obviousness rejection of claims 1-20 spans three decisions, which include *Ex Parte Kahn*, No. 2004-1091 (B.P.A.I. June 30, 2004) ("2004 decision"); *Ex Parte Kahn*, No. 2000-1130 (B.P.A.I. Feb. 24, 2003) ("2003 decision"); and *Ex Parte Kahn*, No. 94-2233 (B.P.A. [\*\*10] I. Sept. 21, 1995) ("1995 decision").

In its 1995 decision, after reversing the examiner's anticipation rejection, the Board *sua sponte* rejected the relevant claims under § 103. The Board found that Garwin taught "the concepts of determining where on a display screen a user is 'looking' . . . and giving either visual or *auditory* feedback to the user" and that "while nothing specific is said as to acoustically reproducing a word displayed at that location, common sense . . . indicates that such an *auditory* feedback response is appropriate in view of such auditory feedback confirmation clearly suggested by Anderson '533 or '626." *1995 decision*, slip op. at 5 (emphasis in original). The Board found that "to whatever extent Garwin is not concerned with text *per se*, [the Anderson] references are" and "teach the advantages of text display with audio reproduction," concluding that

the artisan would have found it to have been obvious to have modified Garwin for display of text passages and selection of works therefrom with vocalization thereof as feedback confirmation, all as taught by Anderson '626 or '533 . . . [or] to have modified either of these Anderson [\*\*11] references to use the eye control of Garwin so that the user's hands would have been free for other tasks.

*Id.*, slip op. at 5-6. The Board found that Stanton "teaches the benefit of acoustic imaging in reading systems" and that "it would have, thus, been further obvious to the artisan to add advantageous acoustic imaging to either of the above-noted modified devices of Garwin or the Anderson patents which would have word positions acoustically and visually indicated." *Id.*, slip op. at 6.

In its 2003 decision, the Board expressly incorporated the findings and rationale [\*984] from both its 1995 decision and the Examiner's Answer filed on April 24, 2000. *2003 decision*, slip op. at 3-4. In the Answer, the Examiner had explained that Garwin teaches "a buffer memory which stores at least a portion of the information derived from sensing means and means for

subsequently retrieving the sensed information," "means for displaying stored written text," and "means for determining which word of the displayed text the user is looking towards"; that Anderson '626 teaches "means for generating speech sounds verbalizing the looked at word"; and that Stanton teaches "means for [\*\*12] verbalizing each word the user's eyes are directed towards in two dimensional stereo." Examiner's Answer at 5-6. Rejecting Kahn's argument that hindsight drove the combination of references, the Board reiterated that the rationale of the 1995 decision was correct and explained that motivation "clearly is based upon a prospective look at the state of the art." *2003 decision*, slip op. at 8-11.

The Board addressed several other arguments. First, the Board rejected the argument that the invention's intended use supports patentability, noting that "the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus [from] a prior art apparatus satisfying the claimed structural limitations." *Id.* at 5-6. Second, the Board rejected the argument that because "the purposes of the [prior art] references . . . are different from the [invention's] purpose," the invention is non-obvious, explaining that "the law . . . does not require that references be combined for reasons contemplated by an inventor" and that "prior art need not suggest the same problem set forth by appellant." *Id.* at 6-7. Third, the Board rejected the arguments that [\*\*13] features of a secondary reference be capable of incorporation into the structure of a primary reference and that the invention be suggested completely by one reference. *Id.* at 7. Finally, the Board rejected a "long-felt need" argument, explaining that Khan had not presented any objective evidence of a long-standing problem or long-standing need in the art. *Id.* at 11-12.

In its 2004 decision, the Board entered a final rejection of claims 1-20 based on its 2003 decision. Kahn timely appealed to this court. We have jurisdiction pursuant to 28 U.S.C. § 1295(a)(4)(A).

## II. DISCUSSION

### A. The Parties' Arguments

Khan advances two main arguments. First, Khan asserts that the Board's finding of motivation to combine was unsupported by substantial evidence. Citing *In re Lee*, 277 F.3d 1338 (Fed. Cir. 2002), and *In re Rouffet*,

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*149 F.3d 1350 (Fed. Cir. 1998)*, Khan argues that the Board over stated the knowledge of the skilled artisan and employed improper hindsight. Specifically, Khan asserts that a skilled artisan would not have sought to augment Garwin with sound because the resulting device would be more expensive and [\*\*14] less reliable for the purpose intended by Garwin. He contends that just because Stanton teaches use of sound to confirm a visual perception of a shape like a letter--which provides a "rudimentary" reading capability--does not mean that the reference teaches how to enable a blind user to "read" and "reread" entire words and phrases quickly. Khan further contends that Stanton teaches away from a system that employs iris eye direction sensing because Stanton requires the user to hold his head steady, because eyes are not involved in its localization procedure, and because the combined device would be expensive and inoperable. Second, Khan argues that the court should take "judicial notice" that his [\*985] reading machine addresses a "long-felt, but unresolved need," and that this consideration is sufficient to rebut a *prima facie* case of obviousness.

The Patent and Trademark Office ("PTO") counters that *Lee and Rouffet* are distinguishable because here the Board identified motivations to combine the references based on specific statements in the references and on the nature of the problem to be solved. As to long-felt need, the PTO argues that Kahn proffered no actual evidence, and [\*\*15] that Kahn's argument alone is insufficient to rebut a *prima facie* case.

#### B. Standard of Review

A claimed invention is unpatentable if the differences between it and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the pertinent art. 35 U.S.C. § 103(a) (2000); *Graham v. John Deere Co.*, 383 U.S. 1, 13-14, 86 S. Ct. 684, 15 L. Ed. 2d 545 (1966). The ultimate determination of whether an invention would have been obvious is a legal conclusion based on underlying findings of fact. *In re Dembiczak*, 175 F.3d 994, 998 (Fed. Cir. 1999). We review the Board's ultimate determination of obviousness *de novo*. *Id.* However, we review the Board's underlying factual findings, including a finding of a motivation to combine, for substantial evidence. *In re Gartside*, 203 F.3d 1305, 1316 (Fed. Cir. 2000).

Substantial evidence is something less than the

weight of the evidence but more than a mere scintilla of evidence. *Id. at 1312* (citing *Consol. Edison Co. v. NLRB*, 305 U.S. 197, 229-30, 59 S. Ct. 206, 83 L. Ed. 126 (1938)). [\*\*16] It means such relevant evidence as a reasonable mind might accept as adequate to support a conclusion. *Consol. Edison*, 305 U.S. at 229-30. In reviewing the record, we must take into account evidence that both justifies and detracts from the factual determinations. *Gartside*, 203 F.3d at 1312 (citing *Universal Camera Corp. v. NLRB*, 340 U.S. 474, 487-88, 71 S. Ct. 456, 95 L. Ed. 456 (1951)). We note that the possibility of drawing two inconsistent conclusions from the evidence does not prevent the Board's findings from being supported by substantial evidence. *Id.* Indeed, if a reasonable mind might accept the evidence as adequate to support the factual conclusions drawn by the Board, then we must uphold the Board's determination. *Id.*

#### C. Analysis

In assessing whether subject matter would have been non-obvious under § 103, the Board follows the guidance of the Supreme Court in *Graham v. John Deere Co.* The Board determines "the scope and content of the prior art," ascertains "the differences between the prior art and the claims at" issue, and resolves "the level of ordinary skill in the pertinent" art. *Dann v. Johnston*, 425 U.S. 219, 226, 96 S. Ct. 1393, 47 L. Ed. 2d 692 (1976) [\*\*17] (quoting *Graham*, 383 U.S. at 17). Against this background, the Board determines whether the subject matter would have been obvious to a person of ordinary skill in the art at the time of the asserted invention. *Graham*, 383 U.S. at 17. In making this determination, the Board can assess evidence related to secondary indicia of non-obviousness like "commercial success, long felt but unresolved needs, failure of others, etc." *Id.*, 383 U.S. at 17-18; *accord Rouffet*, 149 F.3d at 1355. We have explained that

to reject claims in an application under section 103, an examiner must show an unrebutted *prima facie* case of obviousness . . . . On appeal to the Board, an applicant can overcome a rejection by [\*986] showing insufficient evidence of *prima facie* obviousness or by rebutting the *prima facie* case with evidence of secondary indicia of nonobviousness.

*Rouffet*, 149 F.3d at 1355.

Most inventions arise from a combination of old elements and each element may often be found in the prior art. *Id. at 1357*. However, mere identification in the prior art of each element is insufficient to defeat [\*\*18] the patentability of the combined subject matter as a whole. *Id. at 1355, 1357*. Rather, to establish a *prima facie* case of obviousness based on a combination of elements disclosed in the prior art, the Board must articulate the basis on which it concludes that it would have been obvious to make the claimed invention. *Id.* In practice, this requires that the Board "explain the reasons one of ordinary skill in the art would have been motivated to select the references and to combine them to render the claimed invention obvious." *Id. at 1357-59*. This entails consideration of both the "scope and content of the prior art" and "level of ordinary skill in the pertinent art" aspects of the *Graham* test.

When the Board does not explain the motivation, or the suggestion or teaching, that would have led the skilled artisan at the time of the invention to the claimed combination as a whole, we infer that the Board used hindsight to conclude that the invention was obvious. *Id. at 1358*. The "motivation-suggestion-teaching" requirement protects against the entry of hindsight into the obviousness analysis, a problem which § 103 was meant [\*\*19] to confront. See 35 U.S.C. § 103 (stating that obviousness must be assessed "at the time the invention was made"); *Dembiczak*, 175 F.3d at 998 ("It is this phrase that guards against entry into the tempting but forbidden zone of hindsight." (internal quotations omitted)); Giles S. Rich, *Laying the Ghost of the Invention Requirement*, 1 APLA Q.J. 26-45 (1972), reprinted in 14 Fed. Cir. B.J. 163, 170 (2004) ("To protect the inventor from hindsight reasoning, the time is specified to be *the time when the invention was made*.") (emphasis in original). The Supreme Court recognized the hindsight problem in *Graham* and proposed that "legal inferences" resulting from "secondary considerations" might help to overcome it. 383 U.S. at 36 ("[Secondary considerations] may also serve to guard against slipping into use of hindsight, and to resist the temptation to read into the prior art the teachings of the invention in issue." (internal quotations omitted)). By requiring the Board to explain the motivation, suggestion, or teaching as part of its *prima facie* case, the law guards against hindsight [\*\*20] in all cases--whether or not the applicant offers evidence on secondary considerations--which advances Congress's goal of creating a more practical, uniform, and definite test for

patentability. See *Dann*, 425 U.S. at 225-26 ("It was only in 1952 that Congress, in the interest of 'uniformity and 'definiteness, articulated the requirement in a statute." (quoting S. Rep. No. 1979, at 6 (1952); H.R. Rep. No. 1923, at 7 (1952))); *Graham*, 383 U.S. at 17 ("The § 103 [test], when followed realistically, will permit a more practical test of patentability.").

Although our predecessor court was the first to articulate the motivation-suggestion-teaching test, a related test--the "analogous art" test--has long been part of the primary *Graham* analysis articulated by the Supreme Court. See *Dann*, 425 U.S. at 227-29; *Graham*, 383 U.S. at 35.<sup>2</sup> The [\*\*987] analogous-art test requires that the Board show that a reference is either in the field of the applicant's endeavor or is reasonably pertinent to the problem with which the inventor was concerned in order to rely on that reference as a basis for rejection. *In re Oetiker*, 977 F.2d 1443, 1447 (Fed. Cir. 1992). [\*\*21] References are selected as being reasonably pertinent to the problem based on the judgment of a person having ordinary skill in the art. *Id.* ("It is necessary to consider 'the reality of the circumstances, in other words, common sense--in deciding in which fields a person of ordinary skill would reasonably be expected to look for a solution to the problem facing the inventor." (quoting *In re Wood*, 599 F.2d 1032, 1036 (C.C.P.A. 1979))). We have explained that this test begins the inquiry into whether a skilled artisan would have been motivated to combine references by defining the prior art relevant for the obviousness determination, and that it is meant to defend against hindsight. See *id.*; *In re Clay*, 966 F.2d 656, 659-60 (Fed. Cir. 1992).<sup>3</sup>

<sup>2</sup> In *Graham*, Cook Chemical challenged the court's reliance on a reference that it believed was not in a "pertinent prior art," arguing that while the invention involved a container having a "pump sprayer," the reference related to containers having "pouring spouts." 383 U.S. at 35. In reaching the conclusion that the claimed subject matter was obvious, the Court rejected Cook's argument, explaining that the problem to be solved was a mechanical closure problem and that a closure device in such a closely related art was a pertinent reference. *Id.* Similarly, in *Dann*, the invention involved the use of automatic data processing equipment to analyze transactions within a single bank account. 425 U.S. at 227-28. The *Dirk* reference that the Court relied upon in

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making its obviousness case involved a similar system used in a non-banking context. *Id.* at 228. Citing *Graham*, the Court explained that a person of ordinary skill in the art would be aware of this reference and the Court could rely upon it in making its obviousness case because "while the Dirk's invention is not designed specifically for application to the banking industry many of its characteristics and capabilities are similar to those of respondent's system." *Id.* at 229.

[\*\*22]

3 In *In re Clay*, we reasoned that

if a reference disclosure has the same purpose as the claimed invention, the reference relates to the same problem, and that fact supports use of that reference in an obviousness rejection. An inventor may well have been motivated to consider the reference when making his invention. If it is directed to a different purpose, the inventor would accordingly have had less motivation or occasion to consider it.

966 F.2d at 659-60. In *In re Oetiker*, we held that "the combination of elements from non-analogous sources, in a manner that reconstructs the applicant's invention only with the benefit of hindsight, is insufficient to present a *prima facie* case of obviousness." 977 F.2d at 1447.

The motivation-suggestion-teaching test picks up where the analogous art test leaves off and informs the *Graham* analysis. To reach a non-hindsight driven conclusion as to whether a person having ordinary skill in the art at the time of the invention would have viewed the subject matter as a whole to have been obvious in view of multiple references, the Board must provide some rationale, articulation, [\*\*23] or reasoned basis to explain why the conclusion of obviousness is correct. The requirement of such an ex planation is consistent with governing obviousness law, see § 103(a); *Graham*, 383 U.S. at 35; *Dann*, 425 U.S. at 227-29, and helps ensure predictable patentability determinations.

A suggestion, teaching, or motivation to combine the relevant prior art teachings does not have to be found

explicitly in the prior art, as

the teaching, motivation, or suggestion may be implicit from the prior art as a whole, rather than expressly stated in the references. . . . The test for an implicit [\*988] showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art.

*In re Kotzab*, 217 F.3d 1365, 1370 (Fed. Cir. 2000) (internal citations omitted). However, rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness. See *Lee*, 277 F.3d at 1343-46; [\*\*24] *Rouffet*, 149 F.3d at 1355-59. This requirement is as much rooted in the Administrative Procedure Act, which ensures due process and non-arbitrary decisionmaking, as it is in § 103. See *id.* at 1344-45.

In considering motivation in the obviousness analysis, the problem examined is not the specific problem solved by the invention but the general problem that confronted the inventor before the invention was made. See, e.g., *Cross Med. Prods., Inc. v. Medtronic Sofamor Danek, Inc.*, 424 F.3d 1293, 1323 (Fed. Cir. 2005) ("One of ordinary skill in the art need not see the identical problem addressed in a prior art reference to be motivated to apply its teachings."); *Ecolochem, Inc. v. S. Cal. Edison Co.*, 227 F.3d 1361, 1372 (Fed. Cir. 2000) ("Although the suggestion to combine references may flow from the nature of the problem, 'defining the problem in terms of its solution reveals improper hindsight in the selection of the prior art relevant to'" obviousness. (internal citation omitted) (quoting *Monarch Knitting Mach. Corp. v. Sulzer Morat GmbH*, 139 F.3d 877, 881 (Fed. Cir. 1998))); *In re Beattie*, 974 F.2d 1309, 1312 (Fed. Cir. 1992) [\*\*25] ("The law does not require that the references be combined for the reasons contemplated by the inventor."); *Princeton Biochemicals, Inc. v. Beckman Coulter, Inc.*, 411 F.3d 1332, 1337 (Fed. Cir. 2005) (characterizing the relevant inquiry as "[would] an artisan of ordinary skill in the art at the time of the invention, confronted by the same problems as the inventor and with no knowledge of the

claimed invention,[] have selected the various elements from the prior art and combined them in the manner claimed"); *see also Graham*, 383 U.S. at 35 (characterizing the problem as involving mechanical closures rather than in terms more specific to the patent in the context of determining the pertinent prior art). Therefore, the "motivation-suggestion-teaching" test asks not merely what the references disclose, but whether a person of ordinary skill in the art, possessed with the understandings and knowledge reflected in the prior art, and motivated by the general problem facing the inventor, would have been led to make the combination recited in the claims. *See Cross Med. Prods.*, 424 F.3d at 1321-24. From this it may be determined whether [\*\*26] the overall disclosures, teachings, and suggestions of the prior art, and the level of skill in the art--*i.e.*, the understandings and knowledge of persons having ordinary skill in the art at the time of the invention--support the legal conclusion of obviousness. *See Princeton Biochemicals*, 411 F.3d at 1338 (pointing to evidence supplying detailed analysis of the prior art and the reasons one of ordinary skill would have possessed the knowledge and motivation to combine).

In this case, Khan does not dispute that each element of his claimed invention can be found in either Garwin, Anderson '533 and '626, or Stanton, or that each reference lies in the pertinent art. Nor does Khan take issue with the Board's finding that a person having ordinary skill in the art would have been motivated to modify Anderson '533 or '626 in view of [\*989] Garwin, or vice versa. *See Garwin*, col. 2, ll. 50-53, col. 10, ll. 31-35 (stating that "it will be apparent to one skilled in the art that . . . the benefits of the invention will be achieved by many types of apparatus" which may be "virtually [any device] susceptible of control by a computer, including . . . [those geared] to presentation [\*\*27] of textual material").

Rather, Khan's challenge to the sufficiency of the evidence supporting the Board's *prima facie* case is directed at the motivation to apply the teachings of Stanton to achieve the claimed invention. In the 1995 decision, the Board found that Stanton "teaches the benefit of acoustic imaging in reading systems." The Board carefully examined the Anderson/Garwin combination and recognized that a skilled artisan confronted with the problem faced by Kahn would have been led by the teaching of Stanton "to add advantageous acoustic imaging" to the Anderson/Garwin combination so that it would have "word positions acoustically and

visually indicated."

Stanton teaches that "[its] invention relates to augmentation of vision of those who have lost vision or have had their visual faculties diminished," col. 1, ll. 6-8, that it is "useful in teaching a deprivee to apprehend the position of a virtual sound source as representing a point in space," *id.*, ll. 58-59, and that it may be used as a "rudimentary reading device," *id.*, ll. 61-62. A skilled artisan, who knows of a "learning machine" that is capable of reading a word aloud by selecting the word on the screen [\*\*28] at which the user is looking and seeks to provide a visually-impaired user better control over word localization,<sup>4</sup> would have reason to solve that problem by adding two-dimensional sound in view of Stanton's express teaching that two-dimensional sound can be used to "substitute" for the lost sense of sight, to locate a point in space, and to create a "rudimentary reading device" for the visually impaired. *See Cross Med. Prods.*, 424 F.3d at 1323 (holding that "one of ordinary skill in the art need not see the identical problem addressed in a prior art reference to be motivated to apply its teachings"). Because the Board need only establish motivation to combine by a preponderance of the evidence to make its *prima facie* case, *see In re Glaug*, 283 F.3d 1335, 1338 (Fed. Cir. 2002), we conclude that substantial evidence supports the finding of a motivation to combine the teachings of Stanton to the Anderson/Garwin combination. Although a reasonable person might reach the opposite conclusion, there is far more than a "mere scintilla" of evidence present from which a reasonable mind could find a motivation to combine.

<sup>4</sup> Kahn does not argue that one of ordinary skill in the art at the time of the invention would be unaware of the nature of this problem, and there is nothing in the record to suggest this to be the case, unlike the facts in the decision of our predecessor court in *In re Sponnoble*, 56 C.C.P.A. 823, 405 F.2d 578 (C.C.P.A. 1969).

[\*\*29] We reject Khan's argument that the Board overstated the knowledge of the person having ordinary skill in the art or employed improper hindsight in making its *prima facie* case. In both *Lee* and *Rouffet*, the Board recognized that the knowledge of the skilled artisan could provide the motivation to combine but concluded that no such knowledge was articulated and placed on the record. *Lee*, 277 F.3d at 1343-45; *Rouffet*, 149 F.3d at 1357-59.

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In this case, motivation to combine was articulated and placed on the record. As to the Anderson/Garwin combination, the Board identified the desire to free up the hands of the Anderson user as the problem confronted and found that Garwin itself evidenced the broad applicability of its optical [\*990] controls to the claimed invention. As to the addition of Stanton, the Board identified ex press teachings in Stanton of "the benefit of acoustic imaging in reading systems" and properly related those teachings to the Anderson/Garwin combination.

We find Khan's remaining arguments unpersuasive. First, even if applying Stanton to Garwin resulted in a device that would be less effective for the purpose intended by Garwin, [\*\*30] the teaching of the Garwin reference is not limited to the specific invention disclosed. *See In re Heck*, 699 F.2d 1331, 1333 (Fed. Cir. 1983) (explaining that "the use of patents as references is not limited to what the patentees describe as their own inventions" (internal quotations omitted)). As noted above, Garwin states that his invention is intended to be applied to "virtually [any device] susceptible of control by a computer, including . . . [those geared] to presentation of textual material," Garwin, col. 2, ll. 50-53; col. 10, ll. 31-35. Second, although Khan may have envisioned something different than the skilled artisan when he looked at Stanton because Stanton teaches only a *rudimentary* reading device, the skilled artisan need not be motivated to combine Stanton for the same reason contemplated by Khan. *See In re Beattie*, 974 F.2d 1309, 1312 (Fed. Cir. 1992) ("As long as some motivation or suggestion to combine the references is provided by the prior art taken as a whole, the law does not require that the references be combined for the reasons contemplated by the inventor." (citing *In re Kronig*, 539 F.2d 1300, 1304 (C.C.P.A. 1976))). [\*\*31] Third, Khan's argument that Stanton itself teaches away from the combination with Garwin lacks support in the reference. "A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant." *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994). Nothing in Stanton can be said to discourage a person having

ordinary skill in the art from using the visual-input control taught in Garwin in the claimed combination or to lead the skilled artisan in a direction divergent from the path taken by Kahn.

Finally, we note that Kahn had an opportunity to rebut the Board's *prima facie* case by offering evidence of objective indicia of non-obviousness. Khan put on no evidence, but invites this court to take "judicial notice" of the long-felt but unresolved need for a device that will help the blind read. We must decline Khan's invitation for the following reasons. First, "long-felt but unresolved need" is not the kind of undisputed fact to which courts are accustomed to taking "judicial notice" because [\*\*32] a finding either way can "reasonably be questioned." *See Fed. R. Evid. 201(b)* ("A judicially noticed fact must be one not subject to reasonable dispute in that it is either (1) generally known within the territorial jurisdiction of the trial court or (2) capable of accurate and ready determination by resort to sources whose accuracy cannot reasonably be questioned."); *In re Fielder*, 471 F.2d 640, 642-43 (C.C.P.A. 1973) (declining to take judicial notice of prior art references that appellant submitted as objective evidence of non-obviousness because appellant did not offer references to the Board and they were not part of the record). Second, our precedent requires that the applicant submit actual evidence of long-felt need, as opposed to argument. This is because "absent a showing of long-felt need or the failure of others, the mere passage of time without the claimed invention is not evidence of nonobviousness." *Iron Grip Barbell Co. v. USA Sports, Inc.*, 392 F.3d 1317, 1325 [\*991] (Fed. Cir. 2004); accord *In re Wright*, 569 F.2d 1124, 1127 (C. C.P.A. 1977).

### III. CONCLUSION

Because the factual findings [\*\*33] underlying the Board's analysis, including the findings on motivation to combine, are supported by substantial evidence, we conclude that the Board did not err in rejecting claims 1-20 as *prima facie* obvious. Because Khan did not rebut the Board's *prima facie* case, the Board's decision is

AFFIRMED.

LEXSEE 526 F.2D 1399

**IN THE MATTER OF THE APPLICATION OF ERIK REGEL, KARL HEINZ  
BUCHEL and MANFRED PLEMPPEL**

**Patent Appeal No. 75-570**

**UNITED STATES COURT OF CUSTOMS AND PATENT APPEALS**

**526 F.2d 1399; 1975 CCPA LEXIS 102; 188 U.S.P.Q. (BNA) 136**

**December 18, 1975, Decided.**

**PRIOR HISTORY:** [\*\*1] Serial No. 873,098.

R(1) is hydrogen, alkyl of 1 to 4 carbon atoms or phenyl,

**OPINION BY: BALDWIN**

R(2) and R(3) are the same or different and are hydrogen, alkyl of 1 to 4 carbon atoms or phenyl,

**OPINION**

[\*1399] BALDWIN, Judge.

[\*\*2] X and Y are the same or different and are halogen, NO(2), CN, alkyl of 1 to 12 carbon atoms,

This is an appeal from the decision of the Patent and Trademark Office Board [\*1400] of Appeals affirming the examiner's rejection of claims 2, 6 and 19<sup>1</sup> of appellants' application<sup>2</sup> entitled "Bis-imidazolyl-bisphenylmethane, Salts Thereof and Processes for Their Production." We reverse.

S-alkyl of 1 to 4 carbon atoms or alkoxy of 1 to 4 carbon atoms, and

1 Claim 19 was rejected under 35 USC 112, second paragraph. Further discussion of this claim is unnecessary. Appellants have withdrawn their appeal of claim 19 by motion dated June 5, 1975.

m is 0, 1 or 2, and

2 Serial No. 873,098, filed October 31, 1969.

n is 1 or 2 or m is 1 or 2 and n is 0, 1 or 2.

6. A compound according to claim 2 wherein R(1) is hydrogen or alkyl of 1 to 4 carbon atoms, R(2) and R(3) are hydrogen, X and Y are the same or different and are halogen, CN, NO(2), methoxy or methyl and n is 0 or 1.

**References**

The Invention

Fournari et al., Bull. Soc. Chim. France, No. 356 (1968), pages 2438-46 (hereafter Fournari).

Appellants claim certain derivatives of bis-imidazolyl-bisphenylmethane which are disclosed as being non-toxic and pharmaceutically acceptable antimycotics especially useful against dermatomycosis and also against yeast infections of the skin and internal organs. The claims on appeal are as follows:

Mussell et al. 3,321,366 May 23, 1967 (filed Nov. 15, 1965) (hereafter Mussell).

2. A compound of the formula:

Tolkmith et al., Science, Vol. 158 (1967), pages 1462-63 (hereafter Tolkmith).

[Graphic omitted. See illustration in original.]

Fournari discloses various methods of preparing N-substituted imidazole derivatives. Once prepared, the spectra of the various imidazoles were analyzed to determine the exact chemical structures of the compounds. Of the numerous materials studied, three

wherein

were found of particular interest by the Patent and Trademark Office in formulating its rejection (which will be discussed in detail):

[Graphic omitted. See illustration in original.]

[\*1401] Mussell [\*3] discloses the use of certain substituted tritylimidazole compounds <sup>4</sup> "for the control of a wide range of fungi, especially those fungal organisms ordinarily found on the aerial portions of plants." In addition, Mussell teaches that:

4 Mussell's tritylimidazoles are taught to have the following generic structure:

[Graphic omitted. See illustration in original.]

wherein each R independently represents a member selected from the group consisting of halo and lower alkyl and n represents an integer of from 0 to 2, both inclusive, further limited in that one of the 2 and 6 positions is unsubstituted; and each X independently represents hydrogen, lower alkyl, or phenyl, the total number of carbon atoms in all X substituents being an integer of from 0 to 15, both inclusive.

It is an advantage of the present invention that compositions containing these compounds can be applied to growing vegetation in amounts required for effective control without significant injury to the plants. It is a further advantage that the compounds of the present invention are of very low toxicity to mammals.

Last, the Tolkmith article presents the results of a study of certain substituted imidazoles [\*4] and concludes that:

[Imidazoles] substituted on the imine nitrogen atom are likely to be active if the substituent is electron-attracting, and if the atom connecting it to the imidazolyl moiety has tetrahedral geometry. Fungitoxicity is high with phosphinamidothionate and triaryl methyl groups as substituents. The presence of an asymmetric phosphorus atom in the substituent has no effect on fugitotoxicity, but affects mammalian toxicity.

Tolkmith began by studying the properties of N,N-diethyl imidazol-1-yl phenylphosphinamidothionate <sup>5</sup> and noted that it "showed high fungitoxicity, low mammalian toxicity, and very little anticholinergic

activity." It was then hypothesized that the fungitoxic action of the above-recited compound should not be drastically changed if the entire phosphinamidothionate group were replaced by a phosphorus-free substituent of equivalent stereoelectronic nature. In order to test this hypothesis, several materials were tested, including:

5 [Graphic omitted. See illustration in original.]

[Graphic omitted. See illustration in original.]

The tritylimidazole was found to be nearly as active as the reference compound, while demonstrating [\*5] "moderate mammalian toxicity."

#### The Rejection

The board affirmed the examiner's rejection of claims 2 and 6 as being unpatentable (35 USC 103) over (1) Fournari, (2) Fournari in view of Mussell, and (3) Fournari in view of Mussell and Tolkmith. Noting that Fournari does not disclose any utility for the compounds recited therein, the board stated:

At the outset we point out that appellants' invention (i.e., that which is claimed) is a chemical compound or group of compounds; it is not the method of using the compound or of treating humans or animals infected with pathogenic fungi.

[\*1402] Our consideration of the references convinces us that not only would the claimed alkyl or methyl analogue have been obvious, its usefulness as a fungicide also would have been equally obvious. For example, Tolkmith et al. indicate that the fungicidal activity is primarily due to the imidazole moiety of the compound and that the remainder of said compound (a triphenylmethyl group in the case of compound II) "is not in fact critical for high fungicidal activity." Mussell et al. additionally indicate that in imidazole-substituted phenylmethane fungicides both the methyl-substituted phenyl [\*6] and unsubstituted phenyl derivatives possess fungicidal activity. Consequently anyone skilled in the art would expect not only the Fournari et al. bis-imadazolyl-bisphenylmethane to possess fungicidal activity but would also expect similar activity for the corresponding methyl-substituted analogue.

\* \* \*

Regarding appellants' argument based on the fact that the art does not suggest the treatment of fungal

526 F.2d 1399, \*1402; 1975 CCPA LEXIS 102, \*\*6;  
188 U.S.P.Q. (BNA) 136

infections pathogenic to human beings and other animals, it is the Examiner's position that this fact, under the circumstances herein, is not significant. As we have set forth above, the claimed methyl analogue of the Fournari et al. bis-imidazolyl-bisphenylmethane, as well as its use as a fungicide would have been obvious from the art of record. In other words this means that the claimed methyl analogue, as well as its use as a fungicide, would have already been in the possession of the public at the time appellants made their invention. The fact that appellants may have discovered a new specific use for that which is already in the possession of the public does not entitle them to a patent thereon. In effect appellants seek to exclude the public from the use of a chemical [\*\*7] compound for any purpose including the use as a fungicide (e.g., as against *Phytophthora infestans*, *Diplocarpon rosae*, *Sphaerotheca panossa*, *Erysiphe cichoracearum*) when said compound and its use are already in the public domain; *Monsanto Company v. Rohm and Haas Company, supra* (164 USPQ at 565, 566).

On reconsideration, it added:

We remain of the view that appellants have not established in this record any unobvious properties of the claimed class of compounds as a whole nor have they established any unexpected improvement in properties not possessed by the art compounds.

In response to these rejections, appellants submitted to the Patent and Trademark Office two declarations under Rule 132. The first attempted to establish unexpected properties of the methyl analogue of bis-imidazolyl-bisphenylmethane as compared to the corresponding unsubstituted imidazole. The second was submitted by appellants with their reply brief before the board; it was not considered "since it has not been indicated nor seen to be limited to new points of argument in the Examiner's Answer." No further discussion of these declarations is deemed necessary as neither is relied upon in rendering our [\*\*8] decision.

#### Opinion

As quoted, *supra*, the board raised the point that appellants' invention (i.e., that which is claimed) is a chemical compound or group of compounds, not the method of using them in treating humans or animals infected with pathogenic fungi. However, this court on numerous occasions has held that a compound and its

properties are inseparable. *In re Albrecht*, 514 F.2d 1389, 185 USPQ 585 (CCPA 1975); *In re Murch*, 59 CCPA 1277, 464 F.2d 1051, 175 USPQ 89 (1972); *In re Stemniski*, 58 CCPA 1410, 44 F.2d 581, 170 USPQ 343 (1971); *In re Papesch*, 50 CCPA 1084, 315 F.2d 381, 137 USPQ 43 (1963). A finding of unobviousness in consequence depends on comparing the old and new compounds as wholes, inclusive of their properties. *In re Albrecht, supra*.

Although the board affirmed the rejection of claims 2 and 6 as being [\*1403] obvious in view of (1) Fournari, (2) Fournari in view of Mussell, and (3) Fournari in view of Mussell and Tolkmith, we will restrict our discussion to the last-recited rejection - clearly the Office's strongest position. This assumes that the three cited references are combinable, an assumption that we will make, although not without reservation. [\*\*9] <sup>6</sup>

6 As we have stated in the past, there must be some logical reason apparent from positive, concrete evidence of record which justifies a combination of primary and secondary references. *In re Stemniski, supra*. Further, as we stated in *In re Bergel*, 48 CCPA 1102, 1105, 292 F.2d 955, 956, 130 USPQ 206, 208 (1961):

The mere fact that it is possible to find two isolated disclosures which might be combined in such a way to produce a new compound does not necessarily render such production obvious unless the art also contains something to suggest the desirability of the proposed combination.

In the present case, it may reasonably be argued that because Fournari discloses no suggestion of utility for the compounds recited therein, one of ordinary skill in the art would not be prompted to combine this reference with either Mussell or Tolkmith.

Fournari discloses numerous compounds, one of which happens to be bis-imidazolyl-bisphenylmethane. The solicitor characterized this compound as the "parent" of the compounds encompassed by the appealed claims. We read this to imply that when a hindsight selection of possible "R's", "X's", "Y's", "m's" and "n's" is made in appellant's [\*10] claims 2 and 6, it can be made to appear that Fournari differs from appellants' claimed compounds by an alkyl group on one of the phenyl radicals. Therefore, we are faced with the question

whether the secondary references, i.e., Mussell and Tolkmith, disclose enough to render obvious that which is missing in Fournari - the missing alkyl substitution.

Mussell only discloses tritylimidazole compounds. Although the patentees do teach unsubstituted and lower alkyl substituted phenyl radicals, the imidazoles disclosed are those possessing a single imidazole group and three phenyl groups. Furthermore, notwithstanding the board's characterization of Mussell's compounds as possessing "fungicidal activity," we find that such activity is limited to the control of fungi found on plants. As stated by Mussell:

It has been discovered that the tritylimidazole compounds are particularly adapted to be employed for the control of a wide range of fungi, especially those fungal organisms ordinarily found on the aerial portions of plants, such as, for example, cherry leaf spot, black spot, apple scab, rice blast, powdery mildew, *Helminthosporium* (leaf spot on grasses, cereals, and corn), and late [\*\*11] blight. The compounds can also be applied in dormant applications to the woody surfaces of plants or to orchard floor surfaces for the control of the overwintering spores of many fungi. In addition, the tritylimidazole compounds can be applied to seeds to protect the seeds from the attack of fungal organisms such as rot and mildew. Also, the tritylimidazole compounds can be distributed in soil at fungicidal concentrations to control the organisms which attack seeds and plant roots, particularly the fungal organisms of root rot and mildew.

Tolkmith represents a rather complex study, clearly directed towards a theoretician. The results of the study, presented in abstract form, are as follows:

Abstract. Study of several new types of fungitoxic derivatives of imidazole reveals that imidazoles substituted on the imine nitrogen atom are likely to be active if the substituent is electron-attracting, and if the atom connecting it to the imidazolyl moiety has tetrahedral geometry. Fungitoxicity is high with phosphinamidothionate and triarylmethyl groups as substituents. The presence of an asymmetric phosphorus atom in the substituent has no effect on fungitoxicity, but affects mammalian [\*\*12] toxicity.

Both the solicitor and the board rely on Tolkmith for its alleged conclusion that fungicidal activity is primarily due [\*1404] to the imidazole moiety. Although we can

find no such verbatim statement in Tolkmith, we surmise that the following language is that which the board had in mind:

[Fungitoxic] action seemed more likely to result from the nucleophilicity of I<sup>7</sup>, that is, from the power of the azole nitrogen of the imidazolyl group to attack an electrophilic site in the fungus organism by donating electrons to this site.

7 Compound I of Tolkmith is as follows:

[Graphic omitted. See illustration in original.]

Our reading of Tolkmith leads us to a different conclusion.

Tolkmith presents four compounds which were studied for fungicidal activity. All four possess imidazole moieties, but only compound II, an unsubstituted tritylimidazole, was "nearly as active" as the reference compound N,N-diethyylimidazol-1-yl phenylphosphinamidothionate - two others "were markedly less fungicidal." The only conclusion presented in the Tolkmith article is that imidazoles substituted on the imine nitrogen atom are likely to be active if the substituent is [\*\*13] electron-attracting, and if the atom connecting it to the imidazolyl moiety has tetrahedral geometry.

Last, Tolkmith's disclosed utility for the active compounds studied is that of "foliage fungicides." Compound II, relied upon by the board, is taught by Tolkmith to have "[shown] moderate mammalian toxicity."

When we combine the information gleaned from each reference, we are apprised of the following. First, methanes substituted with one, two or three unsubstituted imidazolyls and one, two or three unsubstituted phenyls are known (Fournari). Second, tritylimidazoles with lower alkyl substitution on the phenyl moieties are known as fungicides for plants (Mussell). Third, imidazoles substituted on the imine nitrogen atom are likely to be active foliage fungicides if the substituent is electron-attracting, and if the atom connecting it to the imidazolyl moiety has tetrahedral geometry (Tolkmith). Fourth, and last, tritylimidazole is an active foliage fungicide that exhibits moderate mammalian toxicity (Tolkmith).

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We cannot agree with the board that the information derived from the references, taken as a whole, would render obvious claims 2 and 6 which are directed toward [\*\*14] substituted bisimidazolyl-bisphenylmethanes disclosed as being pharmaceutically acceptable and useful as antimycotics especially against dermatomycosis

caused by Trichophyton and Microsporium species and also against yeast infections of the skin and internal organs. Accordingly, the decision of the board is reversed.

REVERSED

LEXSEE 149 F.3D 1350

**IN RE DENIS ROUFFET, YANNICK TANGUY and FREDERIC BERTHAULT**

**97-1492**

**UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT**

*149 F.3d 1350; 1998 U.S. App. LEXIS 16414; 47 U.S.P.Q.2D (BNA) 1453*

**July 15, 1998, Decided**

**PRIOR HISTORY:** [\*\*1] Appealed from: Patent and Trademark Office Board of Patent Appeals and Interferences. (Serial No. 07/888,791).

**DISPOSITION:** REVERSED.

**COUNSEL:** Richard C. Turner and Grant K. Rowan, Sughrue, Mion, Zinn, Macpeak & Seas, PLLC, of Washington, DC, argued for appellants.

David J. Ball, Jr., Associate Solicitor, Office of the Solicitor, Patent and Trademark Office, of Arlington, Virginia, argued for appellee. With him on the brief were Nancy J. Linck, Solicitor, Albin F. Drost, Deputy Solicitor, and Craig R. Kaufman, Associate Solicitor. Of counsel was Scott A. Chambers, Associate Solicitor, Office of the Solicitor.

**JUDGES:** Before PLAGER, Circuit Judge, ARCHER, Senior Circuit Judge, and RADER, Circuit Judge.

**OPINION BY:** RADER

**OPINION**

[\*1352] RADER, Circuit Judge.

Denis Rouffet, Yannick Tanguy, and Frederic Berthault (collectively, Rouffet) submitted application 07/888,791 (the application) on May 27, 1992. The Board of Patent Appeals and Interferences (the Board) affirmed final rejection of the application as obvious under 35 U.S.C. § 103(a). See *Ex parte Rouffet*, No. 96-1553 (Bd. Pat. App. & Int. Apr. 16, 1997). Because the Board reversibly erred in identifying a motivation to combine the references, this [\*\*2] court reverses.

I.

Satellites in a geosynchronous or geostationary orbit remain over the same point on the Earth's surface. Their constant position above the Earth's surface facilitates communications. These satellites project a number of beams to the Earth. Each beam transmits to its area of coverage, or footprint, on the Earth's surface. In order to provide complete coverage, adjacent footprints overlap slightly and therefore must use different frequencies to avoid interference. However, two or more non-overlapping footprints can use the same set of frequencies in order to use efficiently the limited radio spectrum. Figure 1 from the application shows the coverage of a portion of the Earth's surface provided by multiple cone shaped beams:

[\*1353] [SEE FIGURE 1 IN ORIGINAL]

Frequency reuse techniques, however, have a limited ability to compensate for congestion in geostationary orbits. To alleviate the orbit congestion problem, new telecommunications systems use a network of satellites in low Earth orbit. When viewed from a fixed point on the Earth's surface, such satellites do not remain stationary but move overhead. A satellite's motion as it transmits a plurality of cone-shaped beams [\*\*3] creates a new problem. The satellite's movement causes a receiver on the Earth's surface to move from the footprint of one beam into a second beam transmitted by the same satellite. Eventually, the satellite's motion causes the receiver to move from the footprint of a beam transmitted by one satellite into the footprint of a beam transmitted by a second satellite. Each switch from one footprint to another creates a "handover" event analogous to that which occurs when a traditional cellular phone travels from one cell to another. Handovers are undesirable

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because they can cause interruptions in signal transmission and reception.

Rouffet's application discloses technology to reduce the number of handovers between beams transmitted by the same satellite. In particular, Rouffet eliminates handovers caused solely by the satellite's motion. To accomplish this goal, Rouffet changes the shape of the beam transmitted by the satellite's antenna. Rouffet's satellites transmit fan-shaped beams. A fan beam has an elliptical footprint. Rouffet aligns the long axis of his beams parallel to the direction of the satellite's motion across the Earth's surface. By elongating the beam's footprint in the [\*\*4] direction of satellite travel, Rouffet's invention ensures that a fixed point on the Earth's surface likely will remain within a single footprint until it is necessary to switch to another satellite. Because Rouffet's invention does not address handovers caused by the motion of the receiver across the Earth's [\*1354] surface, his arrangement reduces, but does not eliminate, handovers. Figure 3 from the application shows the footprints 12 from six beams aligned in the direction of satellite motion 15:

[SEE FIGURE 3 IN ORIGINAL]

The application contains ten claims that stand or fall as a group. Claim 1 is representative:

A low orbit satellite communications system for mobile terminals, wherein the communications antenna system of each satellite provides isoflux coverage made up of a plurality of fan beams that are elongate in the travel direction of the satellite.

The examiner initially rejected Rouffet's claims as unpatentable over U.S. Pat. No. 5,199,672 (King) in view of U.S. Pat. No. 4,872,015 (Rosen) and a conference report entitled "A Novel Non-Geostationary Satellite Communications System," Conference Record, International Conference on Communications, [\*\*5] 1981 (Ruddy). On appeal to the Board, the examiner added an alternative ground for rejection, holding that the claims were obvious over U.S. Pat. No. 5,394,561 (Freeburg) in view of U.S. Pat. No. 5,170,485 (Levine).

On April 16, 1997, the Board issued its decision. Because Rouffet had specified that the claims would

stand or fall as a group based on the patentability of claim 1, the Board limited its opinion to that claim. The Board unanimously determined that the examiner had properly rejected claim 1 as obvious over King in view of Rosen and Ruddy. The Board, on a split vote, also affirmed the rejection over Freeburg in view of Levine.

## [\*1355] II

To reject claims in an application under *section 103*, an examiner must show an unrebutted *prima facie* case of obviousness. See *In re Deuel*, 51 F.3d 1552, 1557, 34 U.S.P.Q.2D (BNA) 1210, 1214 (Fed. Cir. 1995). In the absence of a proper *prima facie* case of obviousness, an applicant who complies with the other statutory requirements is entitled to a patent. See *In re Oetiker*, 977 F.2d 1443, 1445, 24 U.S.P.Q.2D (BNA) 1443, 1444 (Fed. Cir. 1992). On appeal to the Board, an applicant can overcome a rejection by showing insufficient evidence of *prima facie* obviousness or by rebutting the *prima facie* case with evidence of secondary indicia of nonobviousness. See *id.*

While this court reviews the Board's determination in light of the entire record, an applicant may specifically challenge an obviousness rejection by showing that the Board reached an incorrect conclusion of obviousness or that the Board based its obviousness determination on incorrect factual predicates. This court reviews the ultimate determination of obviousness as a question of law. See *In re Lueders*, 111 F.3d 1569, 1571, 42 U.S.P.Q.2D (BNA) 1481, 1482 (Fed. Cir. 1997). The factual predicates underlying an obviousness determination include the scope and content of the prior art, the differences between the prior art and the claimed invention, and the level of ordinary skill in the art. See *Monarch Knitting Mach. Corp. v. Sulzer Morat GmbH*, 139 F.3d 877, 881, 45 U.S.P.Q.2D (BNA) 1977, 1981 (Fed. Cir. 1998). This court reviews the Board's factual findings for clear error. See *In re Zurko*, 142 F.3d 1447, 1449, 46 U.S.P.Q.2D (BNA) 1691, 1693 (Fed. Cir. 1998) (in banc); *Leuders*, 111 F.3d at 1571-72. "A finding is clearly erroneous when, although there is evidence to support [\*\*7] it, the reviewing court on the entire evidence is left with the definite and firm conviction that a mistake has been committed." *In re Graves*, 69 F.3d 1147, 1151, 36 U.S.P.Q.2D (BNA) 1697, 1700 (Fed. Cir. 1995) (quoting *United States v. United States Gypsum Co.*, 333 U.S. 364, 395, 92 L. Ed. 746, 68 S. Ct. 525 (1948)).

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The secondary considerations are also essential components of the obviousness determination. See *In re Emert*, 124 F.3d 1458, 1462, 44 U.S.P.Q.2D (BNA) 1149, 1153 (Fed. Cir. 1997) ("Without Emert providing rebuttal evidence, this *prima facie* case of obviousness must stand."). This objective evidence of nonobviousness includes copying, long felt but unsolved need, failure of others, see *Graham v. John Deere Co.*, 383 U.S. 1, 17-18, 15 L. Ed. 2d 545, 86 S. Ct. 684 (1966), commercial success, see *In re Huang*, 100 F.3d 135, 139-40, 40 U.S.P.Q.2D (BNA) 1685, 1689-90 (Fed. Cir. 1996), unexpected results created by the claimed invention, unexpected properties of the claimed invention, see *In re Mayne*, 104 F.3d 1339, 1342, 41 U.S.P.Q.2D (BNA) 1451, 1454 (Fed. Cir. 1997); *In re Woodruff*, 919 F.2d 1575, 1578, 16 U.S.P.Q.2D (BNA) 1934, 1936-37 (Fed. Cir. 1990), licenses showing industry respect for [\*\*8] the invention, see *Arkie Lures, Inc. v. Gene Larew Tackle, Inc.*, 119 F.3d 953, 957, 43 U.S.P.Q.2D (BNA) 1294, 1297 (Fed. Cir. 1997); *Pentec, Inc. v. Graphic Controls Corp.*, 776 F.2d 309, 316, 227 U.S.P.Q. (BNA) 766, 771 (Fed. Cir. 1985), and skepticism of skilled artisans before the invention, see *In re Dow Chem. Co.*, 837 F.2d 469, 473, 5 U.S.P.Q.2D (BNA) 1529, 1532 (Fed. Cir. 1988). The Board must consider all of the applicant's evidence. See *Oetiker*, 977 F.2d at 1445 ("An observation by the Board that the examiner made a *prima facie* case is not improper, as long as the ultimate determination of patentability is made on the entire record."); *In re Piasecki*, 745 F.2d 1468, 1472, 223 U.S.P.Q. (BNA) 785, 788 (Fed. Cir. 1984). The court reviews factual conclusions drawn from this evidence for clear error. Whether the evidence presented suffices to rebut the *prima facie* case is part of the ultimate conclusion of obviousness and is therefore a question of law.

When a rejection depends on a combination of prior art references, there must be some teaching, suggestion, or motivation to combine the references. See *In re Geiger*, 815 F.2d 686, 688, 2 U.S.P.Q.2D (BNA) 1276, 1278 (Fed. Cir. 1987). Although the [\*\*9] suggestion to combine references may flow from the nature of the problem, see *Pro-Mold & Tool Co. v. Great Lakes Plastics, Inc.*, 75 F.3d 1568, 1573, 37 U.S.P.Q.2D (BNA) 1626, 1630 (Fed. Cir. 1996), the suggestion more often comes from the teachings of the pertinent references, see *In re Sernaker*, 702 F.2d 989, 994, 217 U.S.P.Q. (BNA) 1, 5 (Fed. Cir. 1983), or from the ordinary knowledge of those skilled in the art that certain references are of

special importance [\*1356] in a particular field, see *Pro-Mold*, 75 F.3d at 1573 (citing *Ashland Oil, Inc. v. Delta Resins & Refractories, Inc.*, 776 F.2d 281, 297 n.24, 227 U.S.P.Q. (BNA) 657, 667 n.24 (Fed. Cir. 1985)). Therefore, "when determining the patentability of a claimed invention which combines two known elements, 'the question is whether there is something in the prior art as a whole to suggest the desirability, and thus the obviousness, of making the combination.'" See *In re Beattie*, 974 F.2d 1309, 1311-12, 24 U.S.P.Q.2D (BNA) 1040, 1042 (Fed. Cir. 1992) (quoting *Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 1462, 221 U.S.P.Q. (BNA) 481, 488 (Fed. Cir. 1984)).

### III

The parties agree that the five references asserted by the examiner [\*\*10] are in the same field of endeavor as the invention. The parties also agree that the pertinent level of skill in the art - design of satellite communications systems - is high. On appeal, Rouffet asserts that the examiner and the Board erred by improperly combining references to render the claimed invention obvious.

#### *The Combination of King, Rosen, and Ruddy*

The Board first affirmed the rejection of Rouffet's claims over a combination of King, Rosen, and Ruddy. King discloses a system for launching a plurality of satellites into low Earth orbits from a single launch vehicle. Rosen teaches a geostationary satellite that uses a plurality of fan beams with their long axes oriented in an east-west direction to communicate with mobile and fixed terminals on the Earth.

The final, and most important, reference in this combination is Ruddy. Ruddy describes a television broadcast system that uses a series of satellites to retransmit signals sent from a ground station over a wide area. Rather than using a geostationary orbit, Ruddy teaches the use of a series of satellites in Molniya orbits. A satellite in a Molniya orbit always follows the same path through the sky when viewed from a fixed [\*\*11] point on the ground. Viewed from the Earth, the orbital path includes a narrow, elliptical apogee loop. In order to transmit to these moving satellites from a ground station, Ruddy uses a fan beam with a long axis aligned with the long axis of the orbit's apogee loop. This alignment places the entire apogee loop within the footprint of the

beam and eliminates the need for the ground station's antenna to track the satellite's motion around the apogee loop. Ruddy further teaches orbit parameters and spacing of multiple satellites to ensure that a satellite is always in the loop to receive and rebroadcast signals from the Earth station.

King and Rosen together teach the use of a network of satellites in low Earth orbit. Thus, Ruddy becomes the piece of the prior art mosaic that shows, in the reading of the Board, the use of "a plurality of fan beams that are elongate in the travel direction of the satellite." Ruddy, however, is different from the claimed invention in several respects. Specifically, the application claims the projection of multiple elliptical fan-shaped footprints from the satellite to the ground. See Claim 1, *supra*, see also Application at 6, lines 9-11 ("In [\*\*12] addition, in this system, the geometrical shape of the beams 12 is changed: instead of being circular they are now elongate ellipses."). The application's written description further teaches that the invention's fan-shaped satellite beams will minimize handovers. See id. at lines 11-16 ("This considerably increases call durations between handovers.").

In contrast, Ruddy teaches that a ground station may use a single fan-shaped beam to transmit to a satellite in a unique Molniya orbit. The ground station transmits a beam into which a series of satellites in Molniya orbits will successively enter. At least two differences are evident: the application teaches projection of multiple beams from a satellite to the Earth, while Ruddy teaches projection of a single beam from the Earth to satellites. Moreover to the extent Ruddy contains a teaching about handovers, its teachings focus on use of the unique Molniya orbit to ensure that a satellite always falls within the beam transmitted by the ground station.

These differences suggest some difficulty in showing a *prima facie* case of obviousness. The Board, however, specifically found that artisans of ordinary skill in this field of [\*\*13] art would know to shift the frame of reference from a ground station following a satellite to a satellite transmitting to the ground. According proper deference to the Board's finding [\*1357] of a lofty skill level for ordinary artisans in this field, this court discerns no clear error in the Board's conclusion that these differences would not preclude a finding of obviousness. While Ruddy does not expressly teach alignment of the fan beam with the apparent direction of the satellite's

motion, this court perceives no clear error in the Board's determination that Ruddy would suggest such an alignment to one of skill in this art. Therefore, the Board did not err in finding that the combination of King, Rosen, and Ruddy contains all of the elements claimed in Rouffet's application.

However, the Board reversibly erred in determining that one of skill in the art would have been motivated to combine these references in a manner that rendered the claimed invention obvious. Indeed, the Board did not identify any motivation to choose these references for combination. Ruddy does not specifically address handover minimization. To the extent that Ruddy at all addresses handovers due to satellite motion, [\*\*14] it addresses this subject through the selection of orbital parameters. Ruddy does not teach the choice of a particular shape and alignment of the beam projected by the satellite. Thus Ruddy addresses the handover problem with an orbit selection, not a beam shape. The Board provides no reasons that one of ordinary skill in this art, seeking to minimize handovers due to satellite motion, would combine Ruddy with Rosen and King in a manner that would render the claimed invention obvious.

Obviousness is determined from the vantage point of a hypothetical person having ordinary skill in the art to which the patent pertains. See 35 U.S.C. § 103(a). This legal construct is akin to the "reasonable person" used as a reference in negligence determinations. The legal construct also presumes that all prior art references in the field of the invention are available to this hypothetical skilled artisan. See *In re Carlson*, 983 F.2d 1032, 1038, 25 U.S.P.Q.2D (BNA) 1207, 1211 (Fed. Cir. 1993).

As this court has stated, "virtually all [inventions] are combinations of old elements." *Environmental Designs, Ltd. v. Union Oil Co.*, 713 F.2d 693, 698, 218 U.S.P.Q. (BNA) 865, 870 (Fed. Cir. 1983); see also [\*\*15] *Richdel, Inc. v. Sunspool Corp.*, 714 F.2d 1573, 1579-80, 219 U.S.P.Q. (BNA) 8, 12 (Fed. Cir. 1983) ("Most, if not all, inventions are combinations and mostly of old elements."). Therefore an examiner may often find every element of a claimed invention in the prior art. If identification of each claimed element in the prior art were sufficient to negate patentability, very few patents would ever issue. Furthermore, rejecting patents solely by finding prior art corollaries for the claimed elements would permit an examiner to use the claimed invention itself as a blueprint for piecing together elements in the

149 F.3d 1350, \*1357; 1998 U.S. App. LEXIS 16414, \*\*15;  
47 U.S.P.Q.2D (BNA) 1453

prior art to defeat the patentability of the claimed invention. Such an approach would be "an illogical and inappropriate process by which to determine patentability." *Sensonics, Inc. v. AeroSonic Corp.*, 81 F.3d 1566, 1570, 38 U.S.P.Q.2D (BNA) 1551, 1554 (Fed. Cir. 1996).

To prevent the use of hindsight based on the invention to defeat patentability of the invention, this court requires the examiner to show a motivation to combine the references that create the case of obviousness. In other words, the examiner must show reasons that the skilled artisan, confronted with the same problems as the [\*\*16] inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed.

This court has identified three possible sources for a motivation to combine references: the nature of the problem to be solved, the teachings of the prior art, and the knowledge of persons of ordinary skill in the art. In this case, the Board relied upon none of these. Rather, just as it relied on the high level of skill in the art to overcome the differences between the claimed invention and the selected elements in the references, it relied upon the high level of skill in the art to provide the necessary motivation. The Board did not, however, explain what specific understanding or technological principle within the knowledge of one of ordinary skill in the art would have suggested the combination. Instead, the Board merely invoked the high level of skill in the field of art. If such a rote invocation could suffice to supply a motivation to combine, the more sophisticated scientific fields would rarely, if ever, experience a patentable technical advance. Instead, in complex scientific fields, the Board could routinely identify [\*\*17] the prior art elements in an application, invoke the lofty level of skill, and rest its case for rejection. To counter this potential weakness in the obviousness [\*1358] construct, the suggestion to combine requirement stands as a critical safeguard against hindsight analysis and rote application of the legal test for obviousness.

Because the Board did not explain the specific understanding or principle within the knowledge of a skilled artisan that would motivate one with no knowledge of Rouffet's invention to make the combination, this court infers that the examiner selected these references with the assistance of hindsight. This

court forbids the use of hindsight in the selection of references that comprise the case of obviousness. See *In re Gorman*, 933 F.2d 982, 986, 18 U.S.P.Q.2D (BNA) 1885, 1888 (Fed. Cir. 1991). Lacking a motivation to combine references, the Board did not show a proper *prima facie* case of obviousness. This court reverses the rejection over the combination of King, Rosen, and Ruddy.

#### *The Combination of Freeburg and Levine*

Freeburg teaches a cellular radiotelephone system based on a constellation of low Earth orbit satellites that use conical beams to transmit from [\*\*18] the satellite to both fixed and mobile Earth stations. Levine teaches an Earth-based cellular radio system that uses fan beams broadcast from antenna towers. Levine's elliptical footprints are aligned with the road grid. To increase the capacity of traditional ground-based systems through frequency reuse techniques, Levine teaches the use of antennas that broadcast signals with smaller footprints than the prior art system. Thus, Levine actually increases the number of overlap regions between cells and, hence, the number of potential handovers. Figure 1 of the Levine patent illustrates its alignment of beam footprints:

[SEE FIGURE 1 IN ORIGINAL]

[\*1359] As a mobile unit (e.g., a driver using a car phone) moves though a succession of overlapping zones, Levine uses selection algorithms to determine which of the cells is aligned with the travel direction of the mobile unit. These algorithms then select this cell for use while continually monitoring intersecting cells in the event that the mobile unit changes direction.

Once again, this court notes significant differences between the teachings of the application and the Levine-Freeburg combination. The critical Levine reference again involves [\*\*19] a beam from an Earth station without any reference to the "travel direction of [a] satellite." Moreover, Levine actually multiplies the number of potential handovers and then uses software to sort out the necessary handovers from the unnecessary. However, the Board explains the reasons that one possessing the lofty skills characteristic of this field would know to account for the differences between the claimed invention and the prior art combination. This court discerns no clear error in that reliance on the considerable skills in this field.

149 F.3d 1350, \*1359; 1998 U.S. App. LEXIS 16414, \*\*19;  
47 U.S.P.Q.2D (BNA) 1453

This court does, however, discern reversible error in the Board's identification of a motivation to combine Levine and Freeburg. In determining that one of skill in the art would have had motivation to combine Levine and Freeburg, the Board noted that "the level of skill in the art is very high." As noted before, this observation alone cannot supply the required suggestion to combine these references. The Board posits that the high level of skill in the art overcomes the absence of any actual suggestion that one could select part of the teachings of Levine for combination with the satellite system disclosed by Freeburg.

As noted above, the [\*\*20] suggestion to combine requirement is a safeguard against the use of hindsight combinations to negate patentability. While the skill level is a component of the inquiry for a suggestion to combine, a lofty level of skill alone does not suffice to supply a motivation to combine. Otherwise a high level of ordinary skill in an art field would almost always preclude patentable inventions. As this court has often noted, invention itself is the process of combining prior art in a nonobvious manner. See, e.g., *Richdel*, 714 F.2d at 1579; *Environmental Designs*, 713 F.2d at 698. Therefore, even when the level of skill in the art is high, the Board must identify specifically the principle, known to one of ordinary skill, that suggests the claimed combination. Cf. *Gechter v. Davidson*, 116 F.3d 1454, 43 U.S.P.Q.2D (BNA) 1030 (Fed. Cir. 1997) (explaining that the Board's opinion must describe the basis for its decision). In other words, the Board must explain the

reasons one of ordinary skill in the art would have been motivated to select the references and to combine them to render the claimed invention obvious.

The Board's naked invocation of skill in the art to supply a suggestion to combine [\*\*21] the references cited in this case is therefore clearly erroneous. Absent any proper motivation to combine part of Levine's teachings with Freeburg's satellite system, the rejection of Rouffet's claim over these references was improper and is reversed.

#### IV

The Board reversibly erred in determining that there was a motivation to combine either the teachings of King, Rosen, and Ruddy or of Freeburg and Levine in a manner that would render the claimed invention obvious. Because this predicate was missing in each case, the Board did not properly show that these references render the claimed invention obvious. Therefore this court reverses the Board's decision upholding the rejection of Rouffet's claims. In light of this disposition, Rouffet's pending motion to remand the case to the Board for further consideration is denied as moot.

#### COSTS

Each party shall bear its own costs.

REVERSED.

LEXSEE 127 S. CT. 1727

**KSR INTERNATIONAL CO., PETITIONER v. TELEFLEX INC. ET AL.**

**No. 04-1350**

**SUPREME COURT OF THE UNITED STATES**

**127 S. Ct. 1727; 167 L. Ed. 2d 705; 2007 U.S. LEXIS 4745; 75 U.S.L.W. 4289; 82  
U.S.P.Q.2D (BNA) 1385; 20 Fla. L. Weekly Fed. S 248**

**November 28, 2006, Argued  
April 30, 2007, Decided**

**NOTICE:**

[\*\*\*1] The LEXIS pagination of this document is subject to change pending release of the final published version.

**SUBSEQUENT HISTORY:** On remand at *Teleflex, Inc. v. KSR Int'l Co.*, 2007 U.S. App. LEXIS 16051 (Fed. Cir., June 20, 2007)

**PRIOR HISTORY:** ON WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT.

*Teleflex, Inc. v. KSR Int'l Co.*, 119 Fed. Appx. 282, 2005 U.S. App. LEXIS 176 (Fed. Cir., 2005)

**DISPOSITION:** Reversed and remanded.

**SYLLABUS**

To control a conventional automobile's speed, the driver depresses or releases the gas pedal, which interacts with the throttle via a cable or other mechanical link. Because the pedal's position in the footwell normally cannot be adjusted, a driver wishing to be closer or farther from it must either reposition himself in the seat or move the seat, both of which can be imperfect solutions for smaller drivers in cars with deep footwells. This prompted inventors to design and patent pedals that could be adjusted to change their locations. The Asano patent reveals a support structure whereby, when the pedal location is [\*\*\*2] adjusted, one of the pedal's pivot points stays fixed. Asano is also designed so that the force necessary to depress the pedal is the same regardless of location adjustments. The Redding patent

reveals a different, sliding mechanism where both the pedal and the pivot point are adjusted.

In newer cars, computer-controlled throttles do not operate through force transferred from the pedal by a mechanical link, but open and close valves in response to electronic signals. For the computer to know what is happening with the pedal, an electronic sensor must translate the mechanical operation into digital data. Inventors had obtained a number of patents for such sensors. The so-called '936 *patent* taught that it was preferable to detect the pedal's position in the pedal mechanism, not in the engine, so the patent disclosed a pedal with an electronic sensor on a pivot point in the pedal assembly. The Smith patent taught that to prevent the wires connecting the sensor to the computer from chafing and wearing out, the sensor should be put on a fixed part of the pedal assembly rather than in or on the pedal's footpad. Inventors had also patented self-contained modular sensors, which can be [\*\*\*3] taken off the shelf and attached to any mechanical pedal to allow it to function with a computer-controlled throttle. The '068 *patent* disclosed one such sensor. Chevrolet also manufactured trucks using modular sensors attached to the pedal support bracket, adjacent to the pedal and engaged with the pivot shaft about which the pedal rotates. Other patents disclose electronic sensors attached to adjustable pedal assemblies. For example, the Rixon patent locates the sensor in the pedal footpad, but is known for wire chafing.

After petitioner KSR developed an adjustable pedal system for cars with cable-actuated throttles and obtained its '976 *patent* for the design, General Motors Corporation (GMC) chose KSR to supply adjustable pedal systems for trucks using computer-controlled

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throttles. To make the '976 pedal compatible with the trucks, KSR added a modular sensor to its design. Respondents (Teleflex) hold the exclusive license for the Engelgau patent, claim 4 of which discloses a position-adjustable pedal assembly with an electronic pedal position sensor attached a fixed pivot point. Despite having denied a similar, broader claim, the U.S. Patent and Trademark Office (PTO) had allowed [\*\*\*4] claim 4 because it included the limitation of a fixed pivot position, which distinguished the design from Redding's. Asano was neither included among the Engelgau patent's prior art references nor mentioned in the patent's prosecution, and the PTO did not have before it an adjustable pedal with a fixed pivot point. After learning of KSR's design for GMC, Teleflex sued for infringement, asserting that KSR's pedal system infringed the Engelgau patent's claim 4. KSR countered that claim 4 was invalid under § 103 of the Patent Act, which forbids issuance of a patent when "the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art."

*Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17-18, 86 S. Ct. 684, 15 L. Ed. 2d 545, set out an objective analysis for applying § 103: "The scope and content of the prior art are . . . determined; differences between the prior art and the claims at issue are . . . ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background the obviousness or nonobviousness [\*\*\*5] of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented." While the sequence of these questions might be reordered in any particular case, the factors define the controlling inquiry. However, seeking to resolve the obviousness question with more uniformity and consistency, the Federal Circuit has employed a "teaching, suggestion, or motivation" (TSM) test, under which a patent claim is only proved obvious if the prior art, the problem's nature, or the knowledge of a person having ordinary skill in the art reveals some motivation or suggestion to combine the prior art teachings.

The District Court granted KSR summary judgment. After reviewing pedal design history, the Engelgau

patent's scope, and the relevant prior art, the court considered claim 4's validity, applying *Graham's* framework to determine whether under summary-judgment standards KSR had demonstrated that claim 4 was obvious. The court found "little difference" between the prior art's teachings and claim 4: [\*\*\*6] Asano taught everything contained in the claim except using a sensor to detect the pedal's position and transmit it to a computer controlling the throttle. That additional aspect was revealed in, e.g., the '068 patent and Chevrolet's sensors. The court then held that KSR satisfied the TSM test, reasoning (1) the state of the industry would lead inevitably to combinations of electronic sensors and adjustable pedals, (2) Rixon provided the basis for these developments, and (3) Smith taught a solution to Rixon's chafing problems by positioning the sensor on the pedal's fixed structure, which could lead to the combination of a pedal like Asano with a pedal position sensor.

Reversing, the Federal Circuit ruled the District Court had not applied the TSM test strictly enough, having failed to make findings as to the specific understanding or principle within a skilled artisan's knowledge that would have motivated one with no knowledge of the invention to attach an electronic control to the Asano assembly's support bracket. The Court of Appeals held that the District Court's recourse to the nature of the problem to be solved was insufficient because, unless the prior art references [\*\*\*7] addressed the precise problem that the patentee was trying to solve, the problem would not motivate an inventor to look at those references. The appeals court found that the Asano pedal was designed to ensure that the force required to depress the pedal is the same no matter how the pedal is adjusted, whereas Engelgau sought to provide a simpler, smaller, cheaper adjustable electronic pedal. The Rixon pedal, said the court, suffered from chafing but was not designed to solve that problem and taught nothing helpful to Engelgau's purpose. Smith, in turn, did not relate to adjustable pedals and did not necessarily go to the issue of motivation to attach the electronic control on the pedal assembly's support bracket. So interpreted, the court held, the patents would not have led a person of ordinary skill to put a sensor on an Asano-like pedal. That it might have been obvious to try that combination was likewise irrelevant. Finally, the court held that genuine issues of material fact precluded summary judgment.

*Held:* The Federal Circuit addressed the obviousness

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question in a narrow, rigid manner that is inconsistent with § 103 and this Court's precedents. KSR provided convincing [\*\*\*8] evidence that mounting an available sensor on a fixed pivot point of the Asano pedal was a design step well within the grasp of a person of ordinary skill in the relevant art and that the benefit of doing so would be obvious. Its arguments, and the record, demonstrate that the Engelgau patent's claim 4 is obvious. Pp. 11-24.

1. *Graham* provided an expansive and flexible approach to the obviousness question that is inconsistent with the way the Federal Circuit applied its TSM test here. Neither § 103's enactment nor *Graham*'s analysis disturbed the Court's earlier instructions concerning the need for caution in granting a patent based on the combination of elements found in the prior art. See *Great Atlantic & Pacific Tea Co. v. Supermarket Equipment Corp.*, 340 U.S. 147, 152, 71 S. Ct. 127, 95 L. Ed. 162, 1951 Dec. Comm'r Pat. 572. Such a combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results. See, e.g., *United States v. Adams*, 383 U.S. 39, 50-52, 86 S. Ct. 708, 15 L. Ed. 2d 572, 174 Ct. Cl. 1293. When a work is available in one field, design incentives and other market forces can prompt variations of it, either in the same field or in another. If a person [\*\*\*9] of ordinary skill in the art can implement a predictable variation, and would see the benefit of doing so, § 103 likely bars its patentability. Moreover, if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond that person's skill. A court must ask whether the improvement is more than the predictable use of prior-art elements according to their established functions. Following these principles may be difficult if the claimed subject matter involves more than the simple substitution of one known element for another or the mere application of a known technique to a piece of prior art ready for the improvement. To determine whether there was an apparent reason to combine the known elements in the way a patent claims, it will often be necessary to look to interrelated teachings of multiple patents; to the effects of demands known to the design community or present in the marketplace; and to the background knowledge possessed by a person having ordinary skill in the art. To facilitate review, this analysis should [\*\*\*10] be made explicit. But it need not seek out precise teachings

directed to the challenged claim's specific subject matter, for a court can consider the inferences and creative steps a person of ordinary skill in the art would employ. Pp. 11-14.

(b) The TSM test captures a helpful insight: A patent composed of several elements is not proved obvious merely by demonstrating that each element was, independently, known in the prior art. Although common sense directs caution as to a patent application claiming as innovation the combination of two known devices according to their established functions, it can be important to identify a reason that would have prompted a person of ordinary skill in the art to combine the elements as the new invention does. Inventions usually rely upon building blocks long since uncovered, and claimed discoveries almost necessarily will be combinations of what, in some sense, is already known. Helpful insights, however, need not become rigid and mandatory formulas. If it is so applied, the TSM test is incompatible with this Court's precedents. The diversity of inventive pursuits and of modern technology counsels against confining the obviousness analysis [\*\*\*11] by a formalistic conception of the words teaching, suggestion, and motivation, or by overemphasizing the importance of published articles and the explicit content of issued patents. In many fields there may be little discussion of obvious techniques or combinations, and market demand, rather than scientific literature, may often drive design trends. Granting patent protection to advances that would occur in the ordinary course without real innovation retards progress and may, for patents combining previously known elements, deprive prior inventions of their value or utility. Since the TSM test was devised, the Federal Circuit doubtless has applied it in accord with these principles in many cases. There is no necessary inconsistency between the test and the *Graham* analysis. But a court errs where, as here, it transforms general principle into a rigid rule limiting the obviousness inquiry. Pp. 14-15.

(c) The flaws in the Federal Circuit's analysis relate mostly to its narrow conception of the obviousness inquiry consequent in its application of the TSM test. The Circuit first erred in holding that courts and patent examiners should look only to the problem the patentee was trying [\*\*\*12] to solve. Under the correct analysis, any need or problem known in the field and addressed by the patent can provide a reason for combining the elements in the manner claimed. Second, the appeals

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court erred in assuming that a person of ordinary skill in the art attempting to solve a problem will be led only to those prior art elements designed to solve the same problem. The court wrongly concluded that because Asano's primary purpose was solving the constant ratio problem, an inventor considering how to put a sensor on an adjustable pedal would have no reason to consider putting it on the Asano pedal. It is common sense that familiar items may have obvious uses beyond their primary purposes, and a person of ordinary skill often will be able to fit the teachings of multiple patents together like pieces of a puzzle. Regardless of Asano's primary purpose, it provided an obvious example of an adjustable pedal with a fixed pivot point, and the prior art was replete with patents indicating that such a point was an ideal mount for a sensor. Third, the court erred in concluding that a patent claim cannot be proved obvious merely by showing that the combination of elements was obvious to try. [\*\*\*13] When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill in the art has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense. Finally, the court drew the wrong conclusion from the risk of courts and patent examiners falling prey to hindsight bias. Rigid preventative rules that deny recourse to common sense are neither necessary under, nor consistent with, this Court's case law. Pp. 15-18.

2. Application of the foregoing standards demonstrates that claim 4 is obvious. Pp. 18-23.

(a) The Court rejects Teleflex's argument that the Asano pivot mechanism's design prevents its combination with a sensor in the manner claim 4 describes. This argument was not raised before the District Court, and it is unclear whether it was raised before the Federal Circuit. Given the significance of the District Court's finding that combining Asano with a pivot-mounted pedal position sensor fell within claim 4's scope, it is apparent that Teleflex would [\*\*\*14] have made clearer challenges if it intended to preserve this claim. Its failure to clearly raise the argument, and the appeals court's silence on the issue, lead this Court to accept the District Court's conclusion. Pp. 18-20.

(b) The District Court correctly concluded that when Engelgau designed the claim 4 subject matter, it was

obvious to a person of ordinary skill in the art to combine Asano with a pivot-mounted pedal position sensor. There then was a marketplace creating a strong incentive to convert mechanical pedals to electronic pedals, and the prior art taught a number of methods for doing so. The Federal Circuit considered the issue too narrowly by, in effect, asking whether a pedal designer writing on a blank slate would have chosen both Asano and a modular sensor similar to the ones used in the Chevrolet trucks and disclosed in the '068 patent. The proper question was whether a pedal designer of ordinary skill in the art, facing the wide range of needs created by developments in the field, would have seen an obvious benefit to upgrading Asano with a sensor. For such a designer starting with Asano, the question was where to attach the sensor. The '936 patent taught [\*\*\*15] the utility of putting the sensor on the pedal device. Smith, in turn, explained not to put the sensor on the pedal footpad, but instead on the structure. And from Rixon's known wire-chafing problems, and Smith's teaching that the pedal assemblies must not precipitate any motion in the connecting wires, the designer would know to place the sensor on a nonmoving part of the pedal structure. The most obvious such point is a pivot point. The designer, accordingly, would follow Smith in mounting the sensor there. Just as it was possible to begin with the objective to upgrade Asano to work with a computer-controlled throttle, so too was it possible to take an adjustable electronic pedal like Rixon and seek an improvement that would avoid the wire-chafing problem. Teleflex has not shown anything in the prior art that taught away from the use of Asano, nor any secondary factors to dislodge the determination that claim 4 is obvious. Pp. 20-23.

3. The Court disagrees with the Federal Circuit's holding that genuine issues of material fact precluded summary judgment. The ultimate judgment of obviousness is a legal determination. *Graham*, 383 U.S., at 17, 86 S. Ct. 684, 15 L. Ed. 2d 545. Where, as here, the [\*\*\*16] prior art's content, the patent claim's scope, and the level of ordinary skill in the art are not in material dispute and the claim's obviousness is apparent, summary judgment is appropriate. P. 23.

*119 Fed. Appx. 282, reversed and remanded.*

**COUNSEL:** James W. Dabneyargued the cause for petitioner.

Thomas G. Hungarargued the cause for the United

127 S. Ct. 1727, \*; 167 L. Ed. 2d 705, \*\*;  
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States, as amicus curiae, by special leave of court.

### **Thomas C. Goldstein**

**JUDGES:** KENNEDY, J., delivered the opinion for a unanimous Court.

### **OPINION BY: KENNEDY**

#### **OPINION**

[\*\*714] [\*1734] JUSTICE KENNEDY delivered the opinion of the Court.

Teleflex Incorporated and its subsidiary Technology Holding Company -- both referred to here as Teleflex -- sued KSR International Company for patent infringement. The patent at issue, *United States Patent No. 6,237,565 B1*, is entitled "Adjustable Pedal Assembly With Electronic Throttle Control." Supplemental App. 1. The patentee is Steven J. Engelgau, and the patent is referred to as "the Engelgau patent." Teleflex holds the exclusive license to the patent.

Claim 4 of the Engelgau patent describes a mechanism for combining an electronic sensor with an adjustable automobile pedal so the pedal's position can be transmitted to a computer that controls the throttle in the vehicle's engine. When Teleflex accused KSR of infringing the Engelgau patent by adding an electronic sensor to one of KSR's previously [\*\*\*17] designed pedals, KSR countered that claim 4 was invalid under the Patent Act, 35 U.S.C. § 103, because its subject matter was obvious.

*Section 103 forbids issuance of a patent when "the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having [\*\*715] ordinary skill in the art to which said subject matter pertains."*

In *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 86 S. Ct. 684, 15 L. Ed. 2d 545 (1966), the Court set out a framework for applying the statutory language of § 103, language itself based on the logic of the earlier decision in *Hotchkiss v. Greenwood*, 52 U.S. 248, 11 How. 248, 13 L. Ed. 683 (1851), and its progeny. See 383 U.S., at 15-17, 86 S. Ct. 684, 15 L. Ed. 2d 545. The analysis is objective:

"Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background the obviousness or nonobviousness of the subject matter is determined. Such secondary considerations [\*\*\*18] as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented." *Id.*, at 17-18, 86 S. Ct. 684, 15 L. Ed. 2d 545.

While the sequence of these questions might be reordered in any particular case, the factors continue to define the inquiry that controls. If a court, or patent examiner, conducts this analysis and concludes the claimed subject matter was obvious, the claim is invalid under § 103.

Seeking to resolve the question of obviousness with more uniformity and consistency, the Court of Appeals for the Federal Circuit has employed an approach referred to by the parties as the "teaching, suggestion, or motivation" test (TSM test), under which a patent claim is only proved obvious if "some motivation or suggestion to combine the prior art teachings" can be found in the prior art, the nature of the problem, or the knowledge of a person having ordinary skill in the art. See, e.g., *Al-Site Corp. v. VSI Int'l, Inc.*, 174 F.3d 1308, 1323-1324 (CA Fed. 1999). KSR challenges that [\*1735] test, or at least its application in this case. See 119 Fed. Appx. 282, 286-290 (CA Fed. 2005). [\*\*\*19] Because the Court of Appeals addressed the question of obviousness in a manner contrary to § 103 and our precedents, we granted certiorari, 547 U.S. , 126 S. Ct. 2965, 165 L. Ed. 2d 949 (2006). We now reverse.

#### I

#### A

In car engines without computer-controlled throttles, the accelerator pedal interacts with the throttle via cable or other mechanical link. The pedal arm acts as a lever rotating around a pivot point. In a cable-actuated throttle control the rotation caused by pushing down the pedal pulls a cable, which in turn pulls open valves in the carburetor or fuel injection unit. The wider the valves

127 S. Ct. 1727, \*1735; 167 L. Ed. 2d 705, \*\*715;  
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open, the more fuel and air are released, causing combustion to increase and the car to accelerate. When the driver takes his foot off the pedal, the opposite occurs as the cable is released and the valves slide closed.

In the 1990's it became more common to install computers in cars to control engine operation. Computer-controlled throttles open and close valves in response to electronic signals, not through force transferred from the pedal by a mechanical link. Constant, delicate adjustments of air and fuel mixture are possible. The computer's rapid processing of factors beyond the pedal's position improves [\*\*\*20] [\*\*716] fuel efficiency and engine performance.

For a computer-controlled throttle to respond to a driver's operation of the car, the computer must know what is happening with the pedal. A cable or mechanical link does not suffice for this purpose; at some point, an electronic sensor is necessary to translate the mechanical operation into digital data the computer can understand.

Before discussing sensors further we turn to the mechanical design of the pedal itself. In the traditional design a pedal can be pushed down or released but cannot have its position in the footwell adjusted by sliding the pedal forward or back. As a result, a driver who wishes to be closer or farther from the pedal must either reposition himself in the driver's seat or move the seat in some way. In cars with deep footwells these are imperfect solutions for drivers of smaller stature. To solve the problem, inventors, beginning in the 1970's, designed pedals that could be adjusted to change their location in the footwell. Important for this case are two adjustable pedals disclosed in *U.S. Patent Nos. 5,010,782* (filed July 28, 1989) (Asano) and *5,460,061* (filed Sept. 17, 1993) (Redding). The Asano patent reveals a [\*\*\*21] support structure that houses the pedal so that even when the pedal location is adjusted relative to the driver, one of the pedal's pivot points stays fixed. The pedal is also designed so that the force necessary to push the pedal down is the same regardless of adjustments to its location. The Redding patent reveals a different, sliding mechanism where both the pedal and the pivot point are adjusted.

We return to sensors. Well before Engelgau applied for his challenged patent, some inventors had obtained patents involving electronic pedal sensors for computer-controlled throttles. These inventions, such as the device disclosed in *U.S. Patent No. 5,241,936* (filed

Sept. 9, 1991) ('936), taught that it was preferable to detect the pedal's position in the pedal assembly, not in the engine. The '936 patent disclosed a pedal with an electronic sensor on a pivot point in the pedal assembly. *U.S. Patent No. 5,063,811* (filed July 9, 1990) (Smith) taught that to prevent the [\*1736] wires connecting the sensor to the computer from chafing and wearing out, and to avoid grime and damage from the driver's foot, the sensor should be put on a fixed part of the pedal assembly rather than in or on the pedal's [\*\*\*22] footpad.

In addition to patents for pedals with integrated sensors inventors obtained patents for self-contained modular sensors. A modular sensor is designed independently of a given pedal so that it can be taken off the shelf and attached to mechanical pedals of various sorts, enabling the pedals to be used in automobiles with computer-controlled throttles. One such sensor was disclosed in *U.S. Patent No. 5,385,068* (filed Dec. 18, 1992) ('068). In 1994, Chevrolet manufactured a line of trucks using modular sensors "attached to the pedal support bracket, adjacent to the pedal and engaged with the pivot shaft about which the pedal rotates in operation." *298 F. Supp. 2d 581, 589 (ED Mich. 2003)*.

The prior art contained patents involving the placement of sensors on adjustable pedals as well. For example, *U.S. Patent No. 5,819,593* (filed Aug. 17, 1995) (Rixon) discloses an adjustable pedal assembly with an [\*\*717] electronic sensor for detecting the pedal's position. In the Rixon pedal the sensor is located in the pedal footpad. The Rixon pedal was known to suffer from wire chafing when the pedal was depressed and released.

This short account of pedal and sensor technology leads [\*\*\*23] to the instant case.

## B

KSR, a Canadian company, manufactures and supplies auto parts, including pedal systems. Ford Motor Company hired KSR in 1998 to supply an adjustable pedal system for various lines of automobiles with cable-actuated throttle controls. KSR developed an adjustable mechanical pedal for Ford and obtained *U.S. Patent No. 6,151,976* (filed July 16, 1999) ('976) for the design. In 2000, KSR was chosen by General Motors Corporation (GMC or GM) to supply adjustable pedal systems for Chevrolet and GMC light trucks that used engines with computer-controlled throttles. To make the '976 pedal compatible with the trucks, KSR merely took

127 S. Ct. 1727, \*1736; 167 L. Ed. 2d 705, \*\*717;  
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that design and added a modular sensor.

Teleflex is a rival to KSR in the design and manufacture of adjustable pedals. As noted, it is the exclusive licensee of the Engelgau patent. Engelgau filed the patent application on August 22, 2000 as a continuation of a previous application for *U.S. Patent No. 6,109,241*, which was filed on January 26, 1999. He has sworn he invented the patent's subject matter on February 14, 1998. The Engelgau patent discloses an adjustable electronic pedal described in the specification as a "simplified vehicle control [\*\*\*24] pedal assembly that is less expensive, and which uses fewer parts and is easier to package within the vehicle." Engelgau, col. 2, lines 2-5, Supplemental App. 6. Claim 4 of the patent, at issue here, describes:

"A vehicle control pedal apparatus comprising:

a support adapted to be mounted to a vehicle structure;

an adjustable pedal assembly having a pedal arm moveable in fore and aft directions with respect to said support;

a pivot for pivotally supporting said adjustable pedal assembly with respect to said support and defining a pivot axis; and

an electronic control attached to said support for controlling a vehicle system;

said apparatus characterized by said electronic control being responsive to said pivot for providing a signal that corresponds to pedal arm position as said pedal arm pivots about said pivot [\*1737] axis between rest and applied positions wherein the position of said pivot remains constant while said pedal arm moves in fore and aft directions with respect to said pivot." *Id.*, col. 6, lines 17-36, Supplemental App. 8 (diagram numbers omitted).

We agree with the District Court that the claim discloses "a position-adjustable pedal [\*\*\*25] assembly with an electronic pedal position sensor attached to the support member of the pedal assembly. Attaching the sensor to

the support member allows the sensor to remain in a fixed position while the driver adjusts the pedal." 298 F. Supp. 2d, at 586-587.

Before issuing the Engelgau patent the U.S. Patent and Trademark Office (PTO) rejected one of the patent claims that was similar to, but [\*\*718] broader than, the present claim 4. The claim did not include the requirement that the sensor be placed on a fixed pivot point. The PTO concluded the claim was an obvious combination of the prior art disclosed in Redding and Smith, explaining:

"Since the prior art references are from the field of endeavor, the purpose disclosed . . . would have been recognized in the pertinent art of Redding. Therefore it would have been obvious . . . to provide the device of Redding with the . . . means attached to a support member as taught by Smith." *Id.*, at 595.

In other words Redding provided an example of an adjustable pedal and Smith explained how to mount a sensor on a pedal's support structure, and the rejected patent claim merely put these two teachings together.

[\*\*\*26] Although the broader claim was rejected, claim 4 was later allowed because it included the limitation of a fixed pivot point, which distinguished the design from Redding's. *Ibid.* Engelgau had not included Asano among the prior art references, and Asano was not mentioned in the patent's prosecution. Thus, the PTO did not have before it an adjustable pedal with a fixed pivot point. The patent issued on May 29, 2001 and was assigned to Teleflex.

Upon learning of KSR's design for GM, Teleflex sent a warning letter informing KSR that its proposal would violate the Engelgau patent. "Teleflex believes that any supplier of a product that combines an adjustable pedal with an electronic throttle control necessarily employs technology covered by one or more" of Teleflex's patents. *Id.*, at 585. KSR refused to enter a royalty arrangement with Teleflex; so Teleflex sued for infringement, asserting KSR's pedal infringed the Engelgau patent and two other patents. *Ibid.* Teleflex later abandoned its claims regarding the other patents and dedicated the patents to the public. The remaining contention was that KSR's pedal system for GM infringed

127 S. Ct. 1727, \*1737; 167 L. Ed. 2d 705, \*\*718;  
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claim 4 of the Engelgau patent. [\*\*\*27] Teleflex has not argued that the other three claims of the patent are infringed by KSR's pedal, nor has Teleflex argued that the mechanical adjustable pedal designed by KSR for Ford infringed any of its patents.

## C

The District Court granted summary judgment in KSR's favor. After reviewing the pertinent history of pedal design, the scope of the Engelgau patent, and the relevant prior art, the court considered the validity of the contested claim. By direction of 35 U.S.C. § 282, an issued patent is presumed valid. The District Court applied *Graham*'s framework to determine whether under summary-judgment standards KSR had overcome the presumption and demonstrated that claim 4 was obvious in light of the prior art in existence when [\*1738] the claimed subject matter was invented. See § 102(a).

The District Court determined, in light of the expert testimony and the parties' stipulations, that the level of ordinary skill in pedal design was "an undergraduate degree in mechanical engineering (or an equivalent amount of industry experience) [and] familiarity with pedal control systems for vehicles." 298 F. Supp. 2d, at 590. The court then set forth the [\*\*\*28] relevant prior art, including the patents and pedal designs described above.

[\*\*719] Following *Graham*'s direction, the court compared the teachings of the prior art to the claims of Engelgau. It found "little difference." 298 F. Supp. 2d, at 590. Asano taught everything contained in claim 4 except the use of a sensor to detect the pedal's position and transmit it to the computer controlling the throttle. That additional aspect was revealed in sources such as the '068 patent and the sensors used by Chevrolet.

Under the controlling cases from the Court of Appeals for the Federal Circuit, however, the District Court was not permitted to stop there. The court was required also to apply the TSM test. The District Court held KSR had satisfied the test. It reasoned (1) the state of the industry would lead inevitably to combinations of electronic sensors and adjustable pedals, (2) Rixon provided the basis for these developments, and (3) Smith taught a solution to the wire chafing problems in Rixon, namely locating the sensor on the fixed structure of the pedal. This could lead to the combination of Asano, or a pedal like it, with a pedal position sensor.

The conclusion that the [\*\*\*29] Engelgau design was obvious was supported, in the District Court's view, by the PTO's rejection of the broader version of claim 4. Had Engelgau included Asano in his patent application, it reasoned, the PTO would have found claim 4 to be an obvious combination of Asano and Smith, as it had found the broader version an obvious combination of Redding and Smith. As a final matter, the District Court held that the secondary factor of Teleflex's commercial success with pedals based on Engelgau's design did not alter its conclusion. The District Court granted summary judgment for KSR.

With principal reliance on the TSM test, the Court of Appeals reversed. It ruled the District Court had not been strict enough in applying the test, having failed to make "findings as to the specific understanding or principle within the knowledge of a skilled artisan that would have motivated one with no knowledge of [the] invention' . . . to attach an electronic control to the support bracket of the Asano assembly." 119 Fed. Appx., at 288 (brackets in original) (quoting *In re Kotzab*, 217 F.3d 1365, 1371 (CA Fed. 2000)). The Court of Appeals held that the District Court was [\*\*\*30] incorrect that the nature of the problem to be solved satisfied this requirement because unless the "prior art references addressed the precise problem that the patentee was trying to solve," the problem would not motivate an inventor to look at those references. 119 Fed. Appx., at 288.

Here, the Court of Appeals found, the Asano pedal was designed to solve the "constant ratio problem" -- that is, to ensure that the force required to depress the pedal is the same no matter how the pedal is adjusted -- whereas Engelgau sought to provide a simpler, smaller, cheaper adjustable electronic pedal. *Ibid.* As for Rixon, the court explained, that pedal suffered from the problem of wire chafing but was not designed to solve it. In the court's view Rixon did not teach anything helpful to Engelgau's purpose. Smith, in turn, did not relate to adjustable pedals and did not "necessarily go to the issue of motivation [\*1739] to attach the electronic control on the support bracket of the pedal assembly." *Ibid.* When the patents were interpreted in this way, the Court of Appeals held, they would not have led a person of ordinary skill to put a sensor on the sort of pedal described in Asano.

[\*\*\*31] [\*\*720] That it might have been obvious to try the combination of Asano and a sensor was

127 S. Ct. 1727, \*1739; 167 L. Ed. 2d 705, \*\*720;  
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likewise irrelevant, in the court's view, because "'obvious to try" has long been held not to constitute obviousness.'" *Id.*, at 289 (quoting *In re Deuel*, 51 F.3d 1552, 1559 (CA Fed. 1995)).

The Court of Appeals also faulted the District Court's consideration of the PTO's rejection of the broader version of claim 4. The District Court's role, the Court of Appeals explained, was not to speculate regarding what the PTO might have done had the Engelgau patent mentioned Asano. Rather, the court held, the District Court was obliged first to presume that the issued patent was valid and then to render its own independent judgment of obviousness based on a review of the prior art. The fact that the PTO had rejected the broader version of claim 4, the Court of Appeals said, had no place in that analysis.

The Court of Appeals further held that genuine issues of material fact precluded summary judgment. Teleflex had proffered statements from one expert that claim 4 "was a simple, elegant, and novel combination of features," 119 Fed. Appx., at 290, compared to Rixon, [\*\*\*32] and from another expert that claim 4 was nonobvious because, unlike in Rixon, the sensor was mounted on the support bracket rather than the pedal itself. This evidence, the court concluded, sufficed to require a trial.

## II

### A

We begin by rejecting the rigid approach of the Court of Appeals. Throughout this Court's engagement with the question of obviousness, our cases have set forth an expansive and flexible approach inconsistent with the way the Court of Appeals applied its TSM test here. To be sure, *Graham* recognized the need for "uniformity and definiteness." 383 U.S., at 18, 86 S. Ct. 684, 15 L. Ed. 2d 545. Yet the principles laid down in *Graham* reaffirmed the "functional approach" of *Hotchkiss*, 52 U.S. 248, 11 How. 248, 13 L. Ed. 683. See 383 U.S., at 12, 86 S. Ct. 684, 15 L. Ed. 2d 545. To this end, *Graham* set forth a broad inquiry and invited courts, where appropriate, to look at any secondary considerations that would prove instructive. *Id.*, at 17, 86 S. Ct. 684, 15 L. Ed. 2d 545.

Neither the enactment of § 103 nor the analysis in *Graham* disturbed this Court's earlier instructions concerning the need for caution in granting a patent based

on the combination of elements found in the prior art. For over a half century, [\*\*\*33] the Court has held that a "patent for a combination which only unites old elements with no change in their respective functions . . . obviously withdraws what is already known into the field of its monopoly and diminishes the resources available to skillful men." *Great Atlantic & Pacific Tea Co. v. Supermarket Equipment Corp.*, 340 U.S. 147, 152, 71 S. Ct. 127, 95 L. Ed. 162, 1951 Dec. Comm'r Pat. 572 (1950). This is a principal reason for declining to allow patents for what is obvious. The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results. Three cases decided after *Graham* illustrate the application of this doctrine.

In *United States v. Adams*, 383 U.S. 39, 40, 86 S. Ct. 708, 15 L. Ed. 2d 572, 174 Ct. Cl. 1293 (1966), a companion case to *Graham*, the Court considered the obviousness of a "wet battery" that varied from [\*\*721] prior designs in two ways: [\*1740] It contained water, rather than the acids conventionally employed in storage batteries; and its electrodes were magnesium and cuprous chloride, rather than zinc and silver chloride. The Court recognized that when a patent claims a structure already known in the prior art that is altered by the mere substitution of one [\*\*\*34] element for another known in the field, the combination must do more than yield a predictable result. 383 U.S., at 50-51, 86 S. Ct. 708, 15 L. Ed. 2d 572, 174 Ct. Cl. 1293. It nevertheless rejected the Government's claim that Adams's battery was obvious. The Court relied upon the corollary principle that when the prior art teaches away from combining certain known elements, discovery of a successful means of combining them is more likely to be nonobvious. *Id.*, at 51-52, 86 S. Ct. 708, 15 L. Ed. 2d 572, 174 Ct. Cl. 1293. When Adams designed his battery, the prior art warned that risks were involved in using the types of electrodes he employed. The fact that the elements worked together in an unexpected and fruitful manner supported the conclusion that Adams's design was not obvious to those skilled in the art.

In *Anderson's-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57, 90 S. Ct. 305, 24 L. Ed. 2d 258 (1969), the Court elaborated on this approach. The subject matter of the patent before the Court was a device combining two pre-existing elements: a radiant-heat burner and a paving machine. The device, the Court concluded, did not create some new synergy: The radiant-heat burner

127 S. Ct. 1727, \*1740; 167 L. Ed. 2d 705, \*\*721;  
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functioned just as a burner was expected to function; and the paving machine did [\*\*\*35] the same. The two in combination did no more than they would in separate, sequential operation. *Id.*, at 60-62, 90 S. Ct. 305, 24 L. Ed. 2d 258. In those circumstances, "while the combination of old elements performed a useful function, it added nothing to the nature and quality of the radiant-heat burner already patented," and the patent failed under § 103. *Id.*, at 62, 90 S. Ct. 305, 24 L. Ed. 2d 258 (footnote omitted).

Finally, in *Sakraida v. AG Pro, Inc.*, 425 U.S. 273, 96 S. Ct. 1532, 47 L. Ed. 2d 784 (1976), the Court derived from the precedents the conclusion that when a patent "simply arranges old elements with each performing the same function it had been known to perform" and yields no more than one would expect from such an arrangement, the combination is obvious. *Id.*, at 282, 96 S. Ct. 1532, 47 L. Ed. 2d 784.

The principles underlying these cases are instructive when the question is whether a patent claiming the combination of elements of prior art is obvious. When a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, § 103 likely bars its patentability. For [\*\*\*36] the same reason, if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill. *Sakraida* and *Anderson's-Black Rock* are illustrative -- a court must ask whether the improvement is more than the predictable use of prior art elements according to their established functions.

Following these principles may be [\*\*722] more difficult in other cases than it is here because the claimed subject matter may involve more than the simple substitution of one known element for another or the mere application of a known technique to a piece of prior art ready for the improvement. Often, it will be necessary for a court to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having [\*1741] ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the

known elements in the fashion claimed by the patent at issue. To facilitate review, this analysis [\*\*\*37] should be made explicit. See *In re Kahn*, 441 F.3d 977, 988 (CA Fed. 2006) ("Rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness"). As our precedents make clear, however, the analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.

## B

When it first established the requirement of demonstrating a teaching, suggestion, or motivation to combine known elements in order to show that the combination is obvious, the Court of Customs and Patent Appeals captured a helpful insight. See *Application of Bergel*, 292 F.2d 955, 956-957, 48 C.C.P.A. 1102, 1961 Dec. Comm'r Pat. 504 (1961). As is clear from cases such as *Adams*, a patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art. Although common sense directs one to look with care at a patent application that claims as innovation [\*\*\*38] the combination of two known devices according to their established functions, it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does. This is so because inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known.

Helpful insights, however, need not become rigid and mandatory formulas; and when it is so applied, the TSM test is incompatible with our precedents. The obviousness analysis cannot be confined by a formalistic conception of the words teaching, suggestion, and motivation, or by overemphasis on the importance of published articles and the explicit content of issued patents. The diversity of inventive pursuits and of modern technology counsels against limiting the analysis in this way. In many fields it may be that there is little discussion of obvious techniques or combinations, and it often may be the case that market demand, rather than

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scientific literature, will drive design trends. Granting patent protection [\*\*\*39] to advances that would occur in the ordinary course without real innovation retards progress and may, in the case of patents combining previously known elements, deprive prior inventions of their value or utility.

In the years since the Court of Customs and Patent Appeals set forth the [\*\*723] essence of the TSM test, the Court of Appeals no doubt has applied the test in accord with these principles in many cases. There is no necessary inconsistency between the idea underlying the TSM test and the *Graham* analysis. But when a court transforms the general principle into a rigid rule that limits the obviousness inquiry, as the Court of Appeals did here, it errs.

## C

The flaws in the analysis of the Court of Appeals relate for the most part to the court's narrow conception of the obviousness inquiry reflected in its application of the TSM test. In determining whether the subject matter of a patent claim is obvious, neither the particular motivation nor the avowed purpose of the [\*1742] patentee controls. What matters is the objective reach of the claim. If the claim extends to what is obvious, it is invalid under § 103. One of the ways in which a patent's subject matter can be proved obvious is [\*\*\*40] by noting that there existed at the time of invention a known problem for which there was an obvious solution encompassed by the patent's claims.

The first error of the Court of Appeals in this case was to foreclose this reasoning by holding that courts and patent examiners should look only to the problem the patentee was trying to solve. *119 Fed. Appx.*, at 288. The Court of Appeals failed to recognize that the problem motivating the patentee may be only one of many addressed by the patent's subject matter. The question is not whether the combination was obvious to the patentee but whether the combination was obvious to a person with ordinary skill in the art. Under the correct analysis, any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed.

The second error of the Court of Appeals lay in its assumption that a person of ordinary skill attempting to solve a problem will be led only to those elements of

prior art designed to solve the same problem. *Ibid.* The primary purpose of Asano was solving the constant ratio problem; so, the court concluded, [\*\*\*41] an inventor considering how to put a sensor on an adjustable pedal would have no reason to consider putting it on the Asano pedal. *Ibid.* Common sense teaches, however, that familiar items may have obvious uses beyond their primary purposes, and in many cases a person of ordinary skill will be able to fit the teachings of multiple patents together like pieces of a puzzle. Regardless of Asano's primary purpose, the design provided an obvious example of an adjustable pedal with a fixed pivot point; and the prior art was replete with patents indicating that a fixed pivot point was an ideal mount for a sensor. The idea that a designer hoping to make an adjustable electronic pedal would ignore Asano because Asano was designed to solve the constant ratio problem makes little sense. A person of ordinary skill is also a person of ordinary creativity, not an automaton.

The same constricted analysis led the Court of Appeals to conclude, in error, that a patent claim cannot be proved obvious merely by showing that the combination of elements was "obvious to try." *Id.*, at 289 (internal quotation marks omitted). When there is a design need or market pressure to solve a problem [\*\*\*42] and there are a finite number of identified, predictable [\*\*724] solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense. In that instance the fact that a combination was obvious to try might show that it was obvious under § 103.

The Court of Appeals, finally, drew the wrong conclusion from the risk of courts and patent examiners falling prey to hindsight bias. A factfinder should be aware, of course, of the distortion caused by hindsight bias and must be cautious of arguments reliant upon *ex post* reasoning. See *Graham*, 383 U.S., at 36, 86 S. Ct. 684, 15 L. Ed. 2d 545 (warning against a "temptation to read into the prior art the teachings of the invention in issue" and instructing courts to "guard against slipping into the use of hindsight" (quoting *Monroe Auto Equipment Co. v. Heckethorn Mfg. & Supply Co.*, 332 F.2d 406, 412 (CA6 1964))). Rigid preventative rules that deny factfinders recourse to common sense, however, are [\*1743] neither necessary under our case law nor consistent with it.

127 S. Ct. 1727, \*1743; 167 L. Ed. 2d 705, \*\*724;  
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We note the [\*\*\*43] Court of Appeals has since elaborated a broader conception of the TSM test than was applied in the instant matter. See, e.g., *DyStar Textilfarben GmbH & Co. Deutschland KG v. C. H. Patrick Co.*, 464 F.3d 1356, 1367 (2006) ("Our suggestion test is in actuality quite flexible and not only permits, but *requires*, consideration of common knowledge and common sense"); *Alza Corp. v. Mylan Labs., Inc.*, 464 F.3d 1286, 1291 (2006) ("There is flexibility in our obviousness jurisprudence because a motivation may be found *implicitly* in the prior art. We do not have a rigid test that requires an actual teaching to combine . . ."). Those decisions, of course, are not now before us and do not correct the errors of law made by the Court of Appeals in this case. The extent to which they may describe an analysis more consistent with our earlier precedents and our decision here is a matter for the Court of Appeals to consider in its future cases. What we hold is that the fundamental misunderstandings identified above led the Court of Appeals in this case to apply a test inconsistent with our patent law decisions.

### III

When we apply the standards we have [\*\*\*44] explained to the instant facts, claim 4 must be found obvious. We agree with and adopt the District Court's recitation of the relevant prior art and its determination of the level of ordinary skill in the field. As did the District Court, we see little difference between the teachings of Asano and Smith and the adjustable electronic pedal disclosed in claim 4 of the Engelgau patent. A person having ordinary skill in the art could have combined Asano with a pedal position sensor in a fashion encompassed by claim 4, and would have seen the benefits of doing so.

#### A

Teleflex argues in passing that the Asano pedal cannot be combined with a sensor in the manner described by claim 4 because of the design of Asano's pivot mechanisms. See Brief for Respondents 48-49, and n. 17. Therefore, Teleflex reasons, even if adding a sensor to Asano was obvious, that does not establish that claim 4 encompasses obvious subject matter. This argument was not, however, [\*\*725] raised before the District Court. There Teleflex was content to assert only that the problem motivating the invention claimed by the Engelgau patent would not lead to the solution of combining of Asano with a sensor. See Teleflex's

Response [\*\*\*45] to KSR's Motion for Summary Judgment of Invalidity in No. 02-74586 (ED Mich.), pp. 18-20, App. 144a-146a. It is also unclear whether the current argument was raised before the Court of Appeals, where Teleflex advanced the nonspecific, conclusory contention that combining Asano with a sensor would not satisfy the limitations of claim 4. See Brief for Plaintiffs-Appellants in No. 04-1152 (CA Fed.), pp. 42-44. Teleflex's own expert declarations, moreover, do not support the point Teleflex now raises. See Declaration of Clark J. Radcliffe, Ph.D., Supplemental App. 204-207; Declaration of Timothy L. Andresen, *id.*, at 208-210. The only statement in either declaration that might bear on the argument is found in the Radcliffe declaration:

Asano . . . and Rixon . . . are complex mechanical linkage-based devices that are expensive to produce and assemble and difficult to package. It is exactly these difficulties with prior art designs that [Engelgau] resolves. The use of an adjustable pedal with a single pivot reflecting pedal position combined with an electronic control mounted between the [\*1744] support and the adjustment assembly at that pivot was a simple, elegant, and novel combination [\*\*\*46] of features in the Engelgau '565 patent." *Id.*, at 206, P16.

Read in the context of the declaration as a whole this is best interpreted to mean that Asano could not be used to solve "the problem addressed by Engelgau '565[.] to provide a less expensive, more quickly assembled, and smaller package adjustable pedal assembly with electronic control." *Id.*, at 205, P10.

The District Court found that combining Asano with a pivot-mounted pedal position sensor fell within the scope of claim 4. 298 F. Supp. 2d, at 592-593. Given the significance of that finding to the District Court's judgment, it is apparent that Teleflex would have made clearer challenges to it if it intended to preserve this claim. In light of Teleflex's failure to raise the argument in a clear fashion, and the silence of the Court of Appeals on the issue, we take the District Court's conclusion on the point to be correct.

#### B

127 S. Ct. 1727, \*1744; 167 L. Ed. 2d 705, \*\*725;  
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The District Court was correct to conclude that, as of the time Engelgau designed the subject matter in claim 4, it was obvious to a person of ordinary skill to combine Asano with a pivot-mounted pedal position sensor. There then existed a marketplace that created a strong [\*\*\*47] incentive to convert mechanical pedals to electronic pedals, and the prior art taught a number of methods for achieving this advance. The Court of Appeals considered the issue too narrowly by, in effect, asking whether a pedal designer writing on a blank slate would have chosen both Asano and a modular sensor similar to the ones used in the Chevrolet truckline and disclosed in the '068 patent. The District Court employed this narrow inquiry as well, though it reached the correct result nevertheless. The proper question to have asked was whether a pedal designer of ordinary skill, facing the wide range of needs created by developments in the field of endeavor, [\*\*726] would have seen a benefit to upgrading Asano with a sensor.

In automotive design, as in many other fields, the interaction of multiple components means that changing one component often requires the others to be modified as well. Technological developments made it clear that engines using computer-controlled throttles would become standard. As a result, designers might have decided to design new pedals from scratch; but they also would have had reason to make pre-existing pedals work with the new engines. Indeed, upgrading its [\*\*\*48] own pre-existing model led KSR to design the pedal now accused of infringing the Engelgau patent.

For a designer starting with Asano, the question was where to attach the sensor. The consequent legal question, then, is whether a pedal designer of ordinary skill starting with Asano would have found it obvious to put the sensor on a fixed pivot point. The prior art discussed above leads us to the conclusion that attaching the sensor where both KSR and Engelgau put it would have been obvious to a person of ordinary skill.

The '936 patent taught the utility of putting the sensor on the pedal device, not in the engine. Smith, in turn, explained to put the sensor not on the pedal's footpad but instead on its support structure. And from the known wire-chafing problems of Rixon, and Smith's teaching that "the pedal assemblies must not precipitate any motion in the connecting wires," Smith, col. 1, lines 35-37, Supplemental App. 274, the designer would know to place the sensor on a nonmoving part of the pedal

structure. The most obvious nonmoving point on the structure from which a sensor can [\*1745] easily detect the pedal's position is a pivot point. The designer, accordingly, would follow Smith [\*\*\*49] in mounting the sensor on a pivot, thereby designing an adjustable electronic pedal covered by claim 4.

Just as it was possible to begin with the objective to upgrade Asano to work with a computer-controlled throttle, so too was it possible to take an adjustable electronic pedal like Rixon and seek an improvement that would avoid the wire-chafing problem. Following similar steps to those just explained, a designer would learn from Smith to avoid sensor movement and would come, thereby, to Asano because Asano disclosed an adjustable pedal with a fixed pivot.

Teleflex indirectly argues that the prior art taught away from attaching a sensor to Asano because Asano in its view is bulky, complex, and expensive. The only evidence Teleflex marshals in support of this argument, however, is the Radcliffe declaration, which merely indicates that Asano would not have solved Engelgau's goal of making a small, simple, and inexpensive pedal. What the declaration does not indicate is that Asano was somehow so flawed that there was no reason to upgrade it, or pedals like it, to be compatible with modern engines. Indeed, Teleflex's own declarations refute this conclusion. Dr. Radcliffe states that [\*\*\*50] Rixon suffered from the same bulk and complexity as did Asano. See *id.*, at 206. Teleflex's other expert, however, explained that Rixon was itself designed by adding a sensor to a pre-existing mechanical pedal. See *id.*, at 209. If Rixon's base pedal was not too flawed to upgrade, then Dr. Radcliffe's declaration does not show Asano was either. Teleflex may have made a plausible argument that Asano is inefficient as compared [\*\*727] to Engelgau's preferred embodiment, but to judge Asano against Engelgau would be to engage in the very hindsight bias Teleflex rightly urges must be avoided. Accordingly, Teleflex has not shown anything in the prior art that taught away from the use of Asano.

Like the District Court, finally, we conclude Teleflex has shown no secondary factors to dislodge the determination that claim 4 is obvious. Proper application of *Graham* and our other precedents to these facts therefore leads to the conclusion that claim 4 encompassed obvious subject matter. As a result, the claim fails to meet the requirement of § 103.

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We need not reach the question whether the failure to disclose Asano during the prosecution of Engelgau voids the presumption of validity given [\*\*\*51] to issued patents, for claim 4 is obvious despite the presumption. We nevertheless think it appropriate to note that the rationale underlying the presumption -- that the PTO, in its expertise, has approved the claim -- seems much diminished here.

#### IV

A separate ground the Court of Appeals gave for reversing the order for summary judgment was the existence of a dispute over an issue of material fact. We disagree with the Court of Appeals on this point as well. To the extent the court understood the *Graham* approach to exclude the possibility of summary judgment when an expert provides a conclusory affidavit addressing the question of obviousness, it misunderstood the role expert testimony plays in the analysis. In considering summary judgment on that question the district court can and should take into account expert testimony, which may resolve or keep open certain questions of fact. That is not the end of the issue, however. The ultimate judgment of obviousness is a legal determination. *Graham*, 383 U.S., at 17, 86 S. Ct. 684, 15 L. Ed. 2d 545. Where, as here, the content of the prior art, the scope of the patent [\*1746] claim, and the level of ordinary skill in the art are not in material dispute, and [\*\*\*52] the obviousness of the claim is apparent in light of these factors, summary judgment is appropriate. Nothing in the declarations proffered by Teleflex prevented the District Court from reaching the careful conclusions underlying its order for summary judgment in this case.

\* \* \*

We build and create by bringing to the tangible and palpable reality around us new works based on instinct, simple logic, ordinary inferences, extraordinary ideas, and sometimes even genius. These advances, once part of our shared knowledge, define a new threshold from which innovation starts once more. And as progress beginning from higher levels of achievement is expected in the normal course, the results of ordinary innovation are not the subject of exclusive rights under the patent laws. Were it otherwise patents might stifle, rather than promote, the progress of useful arts. See *U.S. Const., Art. I, § 8, cl. 8*. These premises led to the bar on patents claiming obvious subject matter established in *Hotchkiss* and codified in § 103. Application of the bar must not be confined within a test or formulation too constrained to serve its purpose.

KSR provided convincing evidence that mounting a modular [\*\*\*53] sensor on a fixed pivot point of the Asano pedal was a design step well within the [\*\*728] grasp of a person of ordinary skill in the relevant art. Its arguments, and the record, demonstrate that claim 4 of the Engelgau patent is obvious. In rejecting the District Court's rulings, the Court of Appeals analyzed the issue in a narrow, rigid manner inconsistent with § 103 and our precedents. The judgment of the Court of Appeals is reversed, and the case remanded for further proceedings consistent with this opinion.

It is so ordered.

LEXSEE 437 F.3D 1157

**MEDICHEM, S.A., Plaintiff-Appellee, v. ROLABO, S.L., Defendant-Appellant.**

**05-1179, 05-1248**

**UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT**

*437 F.3d 1157; 2006 U.S. App. LEXIS 2653; 77 U.S.P.Q.2D (BNA) 1865*

**February 3, 2006, Decided**

**SUBSEQUENT HISTORY:** Rehearing denied by, Rehearing, en banc, denied by *Medichem, S.A. v. Rolabo, S.L.*, 2006 U.S. App. LEXIS 7669 (Fed. Cir., Mar. 15, 2006)

**PRIOR HISTORY:** [\*\*1]Appealed from: United States District Court for the Southern District of New York. Judge Jed S. Rakoff.

*Medichem, S.A. v. Rolabo, S.L.*, 2004 U.S. Dist. LEXIS 23697 (S.D.N.Y., Nov. 19, 2004)

**DISPOSITION:** AFFIRMED-IN-PART, REVERSED-IN-PART.

**COUNSEL:** John G. Taylor, Frommer Lawrence & Haug LLP, of New York, New York, argued for plaintiff-appellee. With him on the brief were Barry S. White and James K. Stronski.

Thomas P. Heneghan, Michael Best & Friedrich LLP, of Madison, Wisconsin, argued for defendant-appellant. With him on the brief were Jeffrey S. Ward and Charlene L. Yager.

**JUDGES:** Before SCHALL, GAJARSA, DYK, Circuit Judges.

**OPINION BY:** GAJARSA

**OPINION**

[\*1160] GAJARSA, Circuit Judge.

This is the second round of a protracted litigation to establish priority of invention between Stampa et al.'s *U.S. Patent No. 6,084,100* ("the '*100 patent*'"), assigned to

Medichem, S.A. ("Medichem"), and Jackson's *U.S. Patent No. 6,093,827* ("the '*827 patent*'"), assigned to Rolabo, S.L. ("Rolabo"). In the first round appealed to this court, we remanded to the district court, requiring it to establish an interference-in-fact under *35 U.S.C. § 291* before determining priority. *Medichem, S.A. v. Rolabo, S.L.*, 353 F.3d 928 (Fed. Cir. 2003) ("Medichem II"). Rolabo now appeals [\*\*2] from the judgment on remand, in which the United States District Court for the Southern District of New York found the existence of an interference-in-fact and awarded priority of invention to Medichem. See *Medichem, S.A. v. Rolabo, S.L., Memorandum Order*, 2004 U.S. Dist. LEXIS 23697, No. 01 Civ. 3087, 2004 WL 2674632 (S.D.N.Y Nov. 22, 2004) ("Medichem III"). For the reasons discussed below, we affirm the judgment of the district court on the proper establishment of the interfering subject matter and on the finding of the existence of an interference-in-fact. We reverse, however, the district court's award of priority to Medichem, based on the insufficiency of the evidence that Medichem introduced at trial to corroborate the testimony of its inventors regarding reduction to practice of the invention.

**BACKGROUND**

A. The Patents

Medichem and Rolabo are both pharmaceutical manufacturers based in Barcelona, Spain. Rolabo's '*827 patent*' and Medichem's '*100 patent*' both claim a process for making loratadine from two precursor chemicals via a chemical reaction known as the McMurry reaction. Loratadine is the active ingredient in the allergy medication Claritin (R). McMurry reactions involve the [\*\*3] coupling of two starting materials in the presence of low-valent titanium. In general, McMurry reactions

can lead to two types of products, diols and alkenes; loratadine, the desired end product of this reaction, is an alkene. McMurry reactions can be optimized for alkene production by adjusting various reaction parameters, such as the temperature and length of the reaction in this case, and also by adding additional reactants. The only significant difference between the processes claimed by Medicem<sup>1</sup> and Rolabo<sup>2</sup> is that Medicem's [\*1161] process requires the reaction to be carried out in the presence of a type of chemical known as a tertiary amine.<sup>3</sup> In contrast, the Rolabo process permits by not excluding, but does not require, the presence of a tertiary amine. Conceptually, therefore, the Medicem invention, which requires a tertiary amine, is a species within the genus of the Rolabo invention.

1 Claims 1 and 2 of Medicem's '100 patent read:

1. A process for the preparation of loratadine consisting of reacting, in an organic solvent and in the presence of a tertiary amine, 8-chloro-5,6-dihydropyrido[5,6]cyclohepta[1,2-b]pyridin-11-one, of formula VII with a low-valent titanium species. (emphasis added).

2. The process of claim 1, wherein the low-valent titanium species are generated by reduction of titanium tetrachloride with zinc dust.

[\*\*4]

2 Claims 1 and 17 of Rolabo's '827 patent read:

1. A process for preparing 5,6-dihydro-11H-dibenzo[a,d]cyclohept-11-enes comprising reacting a dibenzosuberone or an aza derivative thereof with an aliphatic ketone in the presence of low valent titanium wherein said low valent titanium is generated by zinc.

17. A process as claimed in claim 1 for preparing Loratadine.

3 A tertiary amine is a compound in which nitrogen is bonded three times to carbon. A commonly used tertiary amine is pyridine.

#### B. Proceedings to Date

Medicem brought an action under 35 U.S.C. § 291, alleging an interference-in-fact between the '100 and '827 patents, claiming priority of invention, and seeking invalidation of Rolabo's patent under 35 U.S.C. § 102(g). Transcript of Verdict at 653-67, *Medicem, S.A. v. Rolabo, S.L., No. 01 Civ. 03087, 2002 U.S. Dist. LEXIS 27086 (S.D.N.Y May 8, 2002)* ("Medicem I"). Because Rolabo was the party with the earlier effective filing date, Medicem sought to establish priority by proving an actual reduction to practice that was even earlier.<sup>4</sup> After a bench trial, the district [\*\*5] court found that there was no interference-in-fact between the claimed inventions, but it nonetheless awarded priority to Medicem. *Id.*

4 Rolabo's effective filing date is February 26, 1997 and Medicem's is May 30, 1997.

On appeal, this court vacated the priority holding, opining that because the existence of an interference-in-fact is a jurisdictional requirement under 35 U.S.C. § 291, it was therefore a precondition to the district court's consideration of the priority issue. *Medicem II*, 353 F.3d at 935-36. We explained that the first step in an interference analysis is for the court to determine whether an interference exists under 35 U.S.C. § 291 by asking whether the "patents... have the same or substantially the same subject matter in similar form as that required by the PTO pursuant to 35 U.S.C. § 135."*Id.* at 934 (internal quotations omitted). In order to make this determination, we use the "two-way" test which states that two patents interfere only if (1) invention *A* either anticipates or renders obvious invention *B*, where Party *A* [\*\*6] 's claimed invention is presumed to be prior art vis-a-vis Party *B* and (2) vice versa. *Id.* (citing *Eli Lilly & Co. v. Bd. of Regents of the Univ. of Wash.*, 334 F.3d 1264, 1268 (Fed. Cir. 2003)).

In Medicem II, we held that Medicem's claims to the "species" would clearly anticipate Rolabo's genus claim if the Medicem patent were assumed to be prior art. *Id.* at 934-35. Thus, we held that the first prong of the two-way test was clearly satisfied. *Id.* at 935. However, we remanded to the district court for a determination of

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whether the second prong was also satisfied—namely, whether Rolabo's [\*1162] genus claim, if prior art, would either anticipate or render obvious Medicem's species claim. *Id.* at 935. We explained that "as the '827 patent contains genus claims and the '100 patent contains species claims, an arrangement that assumes that the '827 patent is prior art does not necessarily anticipate or make obvious the narrower claims of the '100 patent." *Id.*

On remand, the district court held that "assuming arguendo [pursuant to the two-way test] the priority of the '827 patent, claims 1 and 17 of the '827 patent clearly anticipate and render [\*7] obvious the adding of a tertiary amine, as in the '100 patent." *Medicem III, 2004 U.S. Dist. LEXIS 23697, 2004 WL 2674632 at \*7.* Although the court went on to explain its holding on obviousness grounds, it was silent about the reasons underlying its apparent determination that Rolabo's genus claims would also anticipate Medicem's species claim. Instead, it improperly recharacterized our remand instructions as "reducing to the question of whether it would be 'obvious' to add tertiary amine to a McMurry reaction to make loratadine." <sup>5</sup> *Id.*(emphasis added).

5 In so doing, the court appears not to have separately considered the question of whether the '827 patent, if taken as prior art, would anticipate the '100 patent.

The court then correctly stated that:

Determining obviousness requires consideration of two factors: 1) whether the prior art would have suggested to one of ordinary skill in the art that he should carry out the claimed process; and 2) whether the prior art would have also revealed that in carrying out the process, one of ordinary skill would have a reasonable expectation of success.

*Id.* The district court proceeded to articulate [\*8] factual bases for its obviousness holding, which included (1) an article that pointed to the use of amines to improve yields in coupling reactions, (2) testimony by Rolabo's expert about additional such prior art, and (3) evidence that such prior art had actually motivated Medicem's inventor's to try adding tertiary amine to the reaction mixture. *Medicem III, 2004 U.S. Dist. LEXIS 23697, 2004 WL 2674632 at \*7-8.*

Having found the two-way test's second prong to be satisfied on both anticipation and obviousness grounds, the district court concluded that the Medicem and Rolabo patents interfered, a finding that gave it jurisdiction over the priority dispute pursuant to 35 U.S.C. § 291. It awarded priority to Medicem, after finding that the invention claimed in the '100 patent was reduced to practice prior to the constructive reduction to practice date of Rolabo's invention. See 2004 U.S. Dist. LEXIS 23697, [WLJ at \*10-11 (referring to Medicem I and stating that the court "reinstates and reaffirms its former priority ruling").

In finding reduction to practice, the court neither explicitly discussed the legal requirement that reduction to practice be corroborated by independent evidence, [\*9] nor made a factual finding of corroboration. However, it dismissed Rolabo's argument that Medicem's inventors were not credible as a result of having fraudulently backdated documents that it had offered to show reduction to practice in 1995. The court thus affirmed its finding in Medicem I that Medicem had provided adequate proof of reduction to practice in 1996. The court did so notwithstanding its previous observation that "the willingness of Medicem to fraudulently backdate [evidence of reduction to practice in 1995], coupled with Medicem's less than punctilious recordkeeping practices . . . does convince the Court that it cannot place the same reliance on plaintiff's testimony and documents as it might otherwise have." Transcript of Verdict at 658, MedicemI. However, the court apparently adhered to [\*1163] its view that Medicem's fraudulent backdating was "chiefly a belated attempt to deal with their noncompliance with [certain] regulatory requirements." *Id.* The Medicem III court therefore reaffirmed its award of priority to Medicem, and Rolabo appealed on February 9, 2005. This court has jurisdiction pursuant to 28 U.S.C. § 1295 [\*10] (a)(1).

As an aside, we wish to note that in parallel with the district court proceedings under 35 U.S.C. § 291, the Board of Patent Appeals and Interferences ("Board") has been considering essentially the same interference and priority issues pursuant to 35 U.S.C. § 135. See *Stampa v. Jackson, 2002 Pat. App. LEXIS 191, 65 U.S.P.Q.2d 1942 (B.P.A.I. 2002)* (involving an interference between Medicem's then-pending reissue application and both Rolabo's patent and a pending continuation application thereof, giving rise to Patent Interference Nos. 105,069 and 105,212). The Board held that the district court's

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holding in *Medichem I* did not bar the Board proceedings on grounds of issue preclusion. See *id.* at 1945-47.

Shortly after the district court's remand decision in *Medichem III*, the Board resolved the interference in favor of Rolabo, reaching a conclusion opposite to that of the district court. See *Stampa v. Jackson*, 76 U.S.P.Q.2d (BNA) 1105, Inter. Nos. 105,069 & 105,212, 2005 Pat. App. LEXIS 12, 2005 WL 596770 (B.P.A.I. January 25, 2005). Central to its decision was Medichem's failure to corroborate its account of an alleged actual reduction [\*\*11] to practice with evidence independent of its inventors' testimony. 76 U.S.P.Q.2d (BNA) 1105, 2005 Pat. App. LEXIS 12, [WLJ] at \*19-20. The Board noted that "all of the evidence regarding an experiment on May 7, 1996 which is said to have obtained loratadine via a process of the count and conducted by [non-inventor] Lola Casas and said to be recorded [in her notebook] is based on the testimony of [Medichem inventors]." 76 U.S.P.Q.2d (BNA) 1105, 2005 Pat. App. LEXIS 12, [WLJ] at \*15. Significantly, Medichem did not produce any testimony from Casas, a failure that the Board perceived as sufficient to permit the inference that Casas' testimony would have been adverse to Medichem. 76 U.S.P.Q.2d (BNA) 1105, 2005 Pat. App. LEXIS 12, [WLJ] at \*20. However, the Board declined to apply such an adverse inference on the grounds that "[Medichem's] case is so weak, we find it unnecessary to draw an inference one way or the other." <sup>6</sup> Id. While appellant does not argue that the Board decision as a binding effect on this court, Board decisions nevertheless represent the views of a panel of specialists in the area of patent law. Medichem has appealed the Board's decision to this court. See *Stampa v. Jackson*, appeal docketed, Nos. 06-1004 & -1029 (Fed. Cir. Oct. 6, 2004 & Oct. 24, 2004).

<sup>6</sup> A final judgment on the merits was issued the same day. See *Stampa v. Jackson*, 76 U.S.P.Q.2d (BNA) 1105, Inter. Nos. 105,069 & 105,212, 2005 Pat. App. LEXIS 12, 2005 WL 596770 (B.P.A.I. January 25, 2005). The Board later denied Medichem's request for rehearing, stating inter alia that "the importance of Lola Casas' testimony is manifest. She is the principal, if not the only, corroborating witness on the issue of whether an actual reduction to practice took place." See *Stampa v. Jackson*, Inter. Nos. 105,069 & 105,212, 2006 Pat. App. LEXIS 40, 2005 WL 1541082 (B.P.A.I. June 27, 2005).

## [\*\*12] DISCUSSION

There are three issues in this case-namely, whether the district court (1) erred in finding the existence of an interference-in-fact; (2) committed reversible error in failing to formally define a count corresponding to the interfering subject matter; and (3) erred in awarding priority of invention to Medichem based on the oral testimony of Medichem co-inventors, testimony that Rolabo claims was not corroborated by independent evidence, and thus should not have been credited in the final determination of whether reduction to practice was established before the critical date.

### [\*1164] A. Existence of an Interference-in-Fact

For the reasons explained below, we agree that under the second prong of the two-way test for obviousness, Rolabo's genus claim renders obvious the Medichem species claim. We therefore affirm the lower court's finding of an interference-in-fact without needing to review the district court's unsupported factual finding that the second prong of the two-way test was independently satisfied on anticipation grounds.

#### 1. Standard of Review

In reviewing a district court's finding of an interference-in-fact pursuant to the two-way test, this court reviews, where [\*\*13] necessary, both the subsidiary findings of anticipation and/or obviousness as they relate to the application of the test. See *Medichem II*, 353 F.3d at 932 (articulating the standard of review for findings of an interference-in-fact under 35 U.S.C. § 291). Here, because we agree with the district court's subsidiary finding of obviousness, which is sufficient to support its finding of an interference-in-fact, it is not necessary for us to review the court's finding of anticipation.

Obviousness under 35 U.S.C. § 103 is a legal conclusion that is reviewed de novo; however, it is based in turn on underlying factual determinations which are reviewed for clear error. *Id.* Under the clear error standard, a reversal is permitted "only when this court is left with a 'definite and firm conviction' that the district court was in error." *Ruiz v. A.B. Chance Co.*, 357 F.3d 1270, 1275 (Fed. Cir. 2004) (quoting *Amhil Enters. Ltd. v. Wawa, Inc.*, 81 F.3d 1554, 1562 (Fed. Cir. 1996)).

#### 2. Obviousness

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The ultimate determination of whether an invention would have been obvious under 35 U.S.C. § 103 [\*\*14] (a) is a legal conclusion based on the factual Graham findings, e.g., "(1) the scope and content of the prior art; (2) the level of ordinary skill in the prior art; and (3) the differences between the claimed invention and the prior art." *Velander v. Garner*, 348 F.3d 1359, 1363 (Fed. Cir. 2003) (citing *Graham v. John Deere Co.*, 383 U.S. 1, 17, 86 S. Ct. 684, 15 L. Ed. 2d 545 (1966)).

This court has held that if all the elements of an invention are found in a combination of prior art references:

a proper analysis under § 103 requires, inter alia, consideration of two factors: (1) whether the prior art would have suggested to those of ordinary skill in the art that they should make the claimed composition or device, or carry out the claimed process; and (2) whether the prior art would also have revealed that in so making or carrying out, those of ordinary skill would have a reasonable expectation of success.

*Id.*

The first requirement, the motivation to combine references, serves to prevent hindsight bias. See *McGinley v. Franklin Sports, Inc.*, 262 F.3d 1339, 1351 (Fed. Cir. 2001) ("To prevent hindsight invalidation of patent [\*\*15] claims, the law requires some 'teaching, suggestion or reason' to combine cited references.") (quoting *Gambro Lundia AB v. Baxter Healthcare Corp.*, 110 F.3d 1573 (Fed. Cir. 1997)). In making obviousness determinations, the test is "whether the subject matter of the claimed inventions would have been obvious to one skilled in the art at the time the inventions were made, *not* what would be obvious to a judge after reading the patents in suit and hearing the testimony." *Panduit Corp. v. Dennison Mfg. Co.*, 774 F.2d 1082, 1092 (Fed. Cir. 1985). Whether such a motivation [\*1165] has been demonstrated is a question of fact. See *Winner Int'l Royalty Corp. v. Wang*, 202 F.3d 1340, 1348 (Fed. Cir. 2000). Evidence of a motivation to combine prior art references "may flow from the prior art references themselves, the knowledge of one of ordinary skill in the art, or, in some cases, from the nature of the problem to

be solved." *Brown & Williamson Tobacco Corp. v. Philip Morris Inc.*, 229 F.3d 1120, 1125 (Fed. Cir. 2000).

When a piece of prior art "suggests that the line of development flowing from the reference's disclosure is unlikely [\*\*16] to be productive of the result sought by the applicant" the piece of prior art is said to "teach away" from the claimed invention. *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994). As with other subsidiary obviousness inquiries, "what a reference teaches and whether it teaches toward or away from the claimed invention are questions of fact." *Winner*, 202 F.3d at 1349 (internal quotations omitted). However, obviousness must be determined in light of all the facts, and there is no rule that a single reference that teaches away will mandate a finding of nonobviousness. Likewise, a given course of action often has simultaneous advantages and disadvantages, and this does not necessarily obviate motivation to combine. See *id.* at 1349 n.8 ("The fact that the motivating benefit comes at the expense of another benefit, however, should not nullify its use as a basis to modify the disclosure of one reference with the teachings of another. Instead, the benefits, both lost and gained, should be weighed against one another."). Where the prior art contains "apparently conflicting" teachings (i.e., where some references teach the combination and others [\*\*17] teach away from it) each reference must be considered "for its power to suggest solutions to an artisan of ordinary skill. . . . considering the degree to which one reference might accurately discredit another." *In re Young*, 927 F.2d 588, 591 (Fed. Cir. 1991).

As stated above, an obviousness determination requires not only the existence of a motivation to combine elements from different prior art references, but also that a skilled artisan would have perceived a reasonable expectation of success in making the invention via that combination. While the definition of "reasonable expectation" is somewhat vague, our case law makes clear that it does not require a certainty of success. See *In re O'Farrell*, 853 F.2d 894, 903-04 (Fed. Cir. 1988) ("Obviousness does not require absolute predictability of success. . . . All that is required is a reasonable expectation of success.").

However, to have a reasonable expectation of success, one must be motivated to do more than merely to "vary all parameters or try each of numerous possible choices until one possibly arrived at a successful result,

where the prior art gave either no indication of which parameters [\*\*18] were critical or no direction as to which of many possible choices is likely to be successful." *Id.* at 903. Similarly, prior art fails to provide the requisite "reasonable expectation" of success where it teaches merely to pursue a "general approach that seemed to be a promising field of experimentation, where the prior art gave only general guidance as to the particular form of the claimed invention or how to achieve it." *Id.*

The district court's finding of a reasonable expectation of success is a question of fact, which we review for clear error. See *Ruiz*, 357 F.3d at 1275 (explaining that the obviousness determination rests on "various factual findings that this court reviews for clear error following a bench trial"); *Brown & Williamson*, 229 F.3d at 1129 [\*1166] (reviewing the district court's finding of reasonable expectation of success under the clear error standard); see also *Velander v. Garner*, 348 F.3d 1359, 1376 (Fed. Cir. 2003) (reviewing the Board of Patent Appeals and Interferences' finding of a reasonable expectation of success under a "substantial evidence" standard).

### 3. Analysis

Rolabo argues that the [\*\*19] district court erred in finding that the Medicem invention (which uses a tertiary amine) would have been obvious over the broader Rolabo invention (which does not require it). Specifically, it appears to argue both that the prior art contained no motivation to combine references so as to have encouraged one reasonably skilled in the art to have added a tertiary amine to a McMurry reaction and that an artisan, even if motivated to add a tertiary amine to Rolabo's process, would have had no reasonable expectation of succeeding in making loratadine via a McMurry reaction in the presence of a tertiary amine.

In support of its arguments, Rolabo cites the trial testimony of an expert witness who explained that a seminal review article in the field showed that a tertiary amine could have "a positive effect, a negative effect, and in some cases, both a positive and negative effect" on the McMurry reaction. Rolabo goes on to cite prior art references that disclose negative effects and essentially argues that the existence of prior art references that teach away from the invention clearly negates the motivation to combine and that the district court's finding of motivation was clearly erroneous. [\*\*20] We disagree.

Granted, it is clear that the prior art disclosed not only potential advantages of using a tertiary amine in a McMurry reaction but also potential disadvantages. On the one hand, some pieces of prior art taught that low concentrations of a tertiary amine could sometimes be used to improve the yield of reactions or to avoid the formation of undesirable rearranged products. On the other hand, other references reported that tertiary amines could sometimes promote the formation of undesirable diol side-products and that when they were used as the reaction solvent (i.e., when tertiary amines are present at their highest possible concentrations), they could stop the reaction completely.

We also note the ambivalence of Medicem co-inventor Dr. Onrubia toward the introduction of a tertiary amine to the reaction mixture. On the one hand, she testified that she had added a tertiary amine "because the literature said that it might be possible to use tertiary amines in the reaction, that it wouldn't interfere, that it wasn't incompatible, and it's habitual in these circumstances to try various options until you get the reaction to work." On the other hand, when asked, "Is this purely [\*\*21] hit or miss or is there some logical cause . . . for believing that tertiary amine would add something?" she responded: "Frankly, as an organic chemist I have no reason to say that there were grounds for expecting anything from the addition of tertiary amine."

As we have explained above, the fact that some teachings in the prior art conflict with others does not render the findings of the district court clearly erroneous per se. Rather, the prior art must be considered as a whole for what it teaches. We understand the prior art, viewed as a whole, to teach that the addition of a tertiary amine sometimes works to improve the yield of McMurry reactions, especially when a tertiary amine is used in relatively low concentrations. In light of this, we cannot say that the district court clearly erred in finding that the prior art would have provided the skilled artisan with a [\*1167] motivation to combine references so as to use pyridine in the McMurry reaction. We wish to emphasize that this is not a case where the prior art's lack of definiteness or certainty about the result of using a tertiary amine in a specific reaction system renders the inventive subject matter "obvious to [\*\*22] try" but not obvious. While we have made clear that "obvious to try" is not the standard under § 103, . . . the meaning of this maxim is sometimes lost." *In re O'Farrell*, 853 F.2d 894,

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903 (*Fed. Cir.* 1988). In O'Farrell, we opined that:

[This] admonition . . . has been directed mainly at two kinds of error[, namely where] . . . what would have been "obvious to try" would have been . . . to vary all parameters or try each of numerous possible choices . . . where the prior art gave . . . no direction as to which of many possible choices is likely to be successful[or] . . . to explore . . . a promising field of experimentation, where the prior art gave only general guidance . . .

*Id.* (citations omitted). In the instant case there are not numerous parameters to vary. Rather, the principal parameter is the concentration of tertiary amine that should be used, and the prior art teaches that if the tertiary amine were to have any positive effect at all, it would be when it was present at low concentrations. Likewise, this is not a case where the prior art gives merely general guidance. In contrast, the guidance is quite clear—namely, that [\*\*23] McMurry reactions of this kind can sometimes be optimized by adding low levels of a tertiary amine.

For the aforementioned reasons, we find no clear error in the district court's determination that skilled artisans in possession of the Rolabo patent and the prior art would have not only been motivated to add a tertiary amine but that they would have possessed a reasonable expectation that they would succeed in optimizing the reaction. Reviewing *de novo* the trial court's application of these factual findings to reach the legal conclusion of obviousness, we likewise find no error. Accordingly, we agree with the district court's determination that the addition of a tertiary amine to a McMurry reaction would have been obvious in view of the Rolabo patent and the prior art. Because this obviousness finding satisfies the second prong of the two-way test for an interference-in-fact, we affirm the district court's determination that an interference-in-fact existed.

As a final matter, we note that we find no merit in Rolabo's contention that we should exclude from the subject matter of the interference that portion of its invention that is directed to running reactions where titanium [\*\*24] is present in specific concentration ranges (claims 10 and 11 of the '827 patent). Claim 10

requires a relative titanium concentration of 1.5:1 to 4:1, and claim 11 requires a ratio of 2:1 to 3:1. The district court relied on the testimony of Medicem's expert witness, Dr. Finney, in holding that all of the various claims of the '827 patent were "essentially identical to one another and substantially the same as claim 2 of Medicem's patent." See *Medicem III*, 2004 U.S. Dist. LEXIS 23697, 2004 WL 2674632 at \*4. Rolabo argues that Finney's expert testimony was "conclusory" and therefore insufficient to establish an interference. However, it is clear from the record that Finney's testimony was far from conclusory. In fact, Finney provided a solid factual basis for his opinion, stating that

"claim 10 says that you should have between, a ratio of one and a half to 4 to 1 titanium to dibenzosuberone. Claim 11 states the range should be 2 to 1 to 3 to 1. These are both perfectly normal ranges. And in fact, the patent examples in the '827 [Rolabo's] patent specify I think about a 2.2 to 1 ratio. . . ."

[\*\*1168] Indeed, other evidence of record also supports the conclusion that these are normal [\*\*25] ranges. The Banerji reference discloses ratios of 2:1 and 1:1, Ishida discloses ratios of 1.5:1, 2.5:1 and 5:1, and Lenoir discloses a ratio of about 1:1.

In short, it is clear that Rolabo's claims 10 and 11 are directed to titanium ratios that are entirely within the range of the prior art, and this fact is dispositive. This court has held that "selecting a narrow range from within a somewhat broader range disclosed in a prior art reference is no less obvious than identifying a range that simply overlaps a disclosed range." *In re Peterson*, 315 F.3d 1325, 1330 (*Fed. Cir.* 2003). Moreover, when "the claimed ranges are completely encompassed by the prior art, the conclusion is even more compelling than in cases of mere overlap." *Id.* We have explained that the "normal desire of scientists or artisans to improve upon what is already generally known provides the motivation to determine where in a disclosed set of percentage ranges is the optimum combination of percentages." *Id.* Therefore, because Rolabo's claims 10 and 11 are directed to ratios that are entirely within the prior art, the district court properly held those claims to be part of the interfering subject [\*\*26] matter pursuant to the two-way test.

#### B. Identification of Interfering Subject Matter

Having affirmed the district court's determination that an interference-in-fact exists, and that it properly includes those claims directed to specific titanium ratios, this court turns to address Rolabo's procedural argument that the district court erred when it failed to comply with the Board's practice of articulating a precise count of the interference prior to making priority determinations.

This court has not yet addressed "whether district courts handling interfering patent suits under § 291 must define this interfering subject matter in a way similar to a count." *Slip Track Sys., Inc. v. Metal-Lite, Inc.*, 304 F.3d 1256, 1264 (Fed. Cir. 2002). Nevertheless, we have made clear that at least "a single description of the interfering subject matter is necessary for a determination of priority." *Id.*

That said, *SlipTrack* does not require a court to refer explicitly to the interfering subject matter as a "count," and we believe that in this case the district court was clear about the identity of the interfering subject matter, stating in its opinion "all the various claims [\*\*27] of the '827 patent are essentially identical to one another and substantially the same as claim 2 of Medicem's patent." *Medicem III*, 2004 U.S. Dist. LEXIS 23697, 2004 WL 2674632 at \*4. Moreover, to the extent that the district court may not have been clear about whether the tertiary amine limitation was part of the interfering subject matter, we can resolve this issue on appeal. See *Slip Track*, 304 F.3d at 1264-65 (holding that where "the parties . . . dispute only whether one limitation is part of the interfering subject matter, and determination of this issue is dependent upon issues of law alone, we will resolve this issue on appeal.") Accordingly, we hold that the interfering subject matter in this case does not include the limitation of the tertiary amine, and corresponds to claim 17 of Rolabo's '827 patent. See *id.* 1265 ("Since the claims of the '760 patent do not include a wallboard . . . the wallboard cannot be an element of the interfering subject matter in this case, even though it is a limitation in the claims of the '203 patent.").<sup>7</sup>

<sup>7</sup> We note that in parallel interference proceedings, pursuant to 35 U.S.C. § 135, the Board reached a similar definition of the count. See *Stampa v. Jackson*, 2002 Pat. App. LEXIS 191, 65 U.S.P.Q.2d 1942, 1948 (B.P.A.I. 2002) (defining the count as Jackson's (Rolabo's) claim 17).

[\*\*28] [\*1169] C. Priority of Invention

Finally, we review the district court's award of priority of invention to Medicem. Because the Medicem '100 patent issued from an application that had a later effective filing date than did Rolabo's '827 patent application, see supra note 4, Medicem bears the burden of establishing priority by a preponderance of the evidence. See *Eli Lilly & Co. v. Aradigm Corp.*, 376 F.3d 1352, 1365 (Fed. Cir. 2004) ("Under 35 U.S.C. § 291, a party that does not have the earliest effective filing date needs only to demonstrate by a preponderance of the evidence that it was the first to invent if the two patents or applications at issue were co-pending before the PTO . . ."). Medicem bears no heightened burden, because neither patent enjoys a statutory presumption of validity. See *id.* ("The presumption of validity is nonexistent and the preponderance of the evidence burden is appropriate even if both of the patents have issued by the time a section 291 interference proceeding is initiated in a district court.").

We have held that "priority of invention goes to the first party to reduce an invention to practice unless the [\*\*29] other party can show that it was the first to conceive of the invention and that it exercised reasonable diligence in later reducing that invention to practice." *Cooper v. Goldfarb*, 154 F.3d 1321, 1327 (Fed. Cir. 1998). Here, because neither party relied on a date of conception, priority is properly awarded to the party that was the first to reduce its invention to practice, either actually or constructively. Rolabo relies on its date of constructive reduction to practice, namely its February 26, 1997 effective filing date. Medicem, on the other hand, alleges that it achieved an actual reduction to practice in the spring of 1996, a date which if proven would antecede Rolabo's filing date, and thereby entitle it to priority. See supra note 4 (effective filing dates).

In order to establish an actual reduction to practice, Medicem must establish three things: "(1) construction of an embodiment or performance of a process that met all the limitations of the interference count; (2) . . . determination that the invention would work for its intended purpose," *Cooper*, 154 F.3d at 1327; and (3) the existence of sufficient evidence to corroborate [\*\*30] inventor testimony regarding these events, see *id.* at 1330 ("In order to establish an actual reduction to practice, an inventor's testimony must be corroborated by independent evidence."). The key issue on appeal is the last one, namely whether Medicem provided adequate corroboration of the inventors' testimony regarding the

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alleged actual reduction to practice.

For purposes of conceptual clarity, as well as clarity of language, it should be noted that no similar condition of "corroboration" is imposed on an inventor's notebook, or indeed on any documentary or physical evidence, as a condition for its serving as evidence of reduction to practice. See, e.g., *Mahurkar v. C.R. Bard, Inc.*, 79 F.3d 1572, 1577-78 (Fed. Cir. 1996) (explaining that "this court does not require corroboration where a party seeks to prove conception through the use of physical exhibits because the trier of fact can conclude for itself what documents show, aided by testimony as to what the exhibit would mean to one skilled in the art"); *Price v. Symsek*, 988 F.2d 1187, 1195 (Fed. Cir. 1993) ("Only the inventor's testimony requires corroboration [\*1170] before it [\*\*31] can be considered."). Of course, the credibility (and therefore the corroborative value) of an inventor's notebook may vary. Nevertheless, a notebook, unlike the oral testimony of an inventor, may be weighed, for whatever it is worth, in the final determination of reduction to practice. However, in a case involving reduction to practice, an unwitnessed notebook is insufficient on its own to support a claim of reduction to practice. See *Reese v. Hurst*, 661 F.2d 1222, 1232 (CCPA 1981) ("The inventors' notebooks are accorded no more weight than the inventors' testimony in this instance, since they were not witnessed or signed and were unseen by any witness until after this interference was declared."); *Hahn v. Wong*, 892 F.2d 1028, 1033 (Fed. Cir. 1989) (stating that "affiants' statements that by a certain date they had 'read and understood' specified pages of Stephen Hahn's laboratory notebooks did not corroborate a reduction to practice . . . because they established only that those pages existed on a certain date . . . [and] did not independently corroborate the statements made on those pages); *Singh v. Brake*, 222 F.3d 1362, 1370 (Fed. Cir. 2000) [\*\*32] (stating that *Hahn v. Wong* did not nullify the value of laboratory notebooks in corroborating conception because "the standard of proof required to corroborate a reduction to practice [is] more stringent . . . than that required to corroborate a conception.").<sup>8</sup> Once properly admitted into evidence, documentary and physical evidence is assigned probative value and collectively weighed to determine whether reduction to practice has been achieved. This is what is meant by the maxim that documentary and physical evidence do not require "corroboration."

<sup>8</sup> Cf. *Stern v. Trs. of Columbia Univ.*, 434 F.3d 1375, 2006 U.S. App. LEXIS 1015, No. 05-1291, slip op. at 5 (Fed. Cir. Jan. 17, 2006) ("Regardless of the contents of the notebooks, unwitnessed laboratory notebooks on their own are insufficient to support his claim [of conception, and therefore] of co-inventorship.").

## 1. Corroboration

Credibility concerns undergird the corroboration requirement, the purpose of which is to prevent fraud. See *Chen v. Bouchard*, 347 F.3d 1299, 1309 (Fed. Cir. 2003) ("The purpose of corroboration . . . is to prevent fraud, by providing independent confirmation of the inventor's testimony.") (internal [\*\*33] quotations omitted). As such, the corroboration requirement provides an additional safeguard against courts being deceived by inventors who may be tempted to mischaracterize the events of the past through their testimony. See *Mahurkar*, 79 F.3d at 1577 ("While perhaps prophylactic in application given the unique abilities of trial court judges and juries to assess credibility, the rule provides a bright line for both district courts and the PTO to follow in addressing the difficult issues related to invention dates.").

Sufficiency of corroboration is determined by using a "rule of reason" analysis, under which all pertinent evidence is examined when determining the credibility of an inventor's testimony. See *Price v. Symsek*, 988 F.2d 1187, 1195 (Fed. Cir. 1993) ("A rule of reason' analysis is applied to determine whether the inventor's prior conception testimony has been corroborated."); *Berges v. Gottstein*, 618 F.2d 771, 776 (CCPA 1980) ("In the final analysis, each corroboration case must be decided on its own facts with a view to deciding whether the evidence as a whole is persuasive.").

The requirement of independent knowledge [\*\*34] remains key to the corroboration inquiry. See *Reese v. Hurst*, 661 F.2d 1222, 1225 (CCPA 1981) ("Adoption of the 'rule of reason' has not altered the [\*1171] requirement that evidence of corroboration must not depend solely on the inventor himself."). "Independent corroboration may consist of testimony of a witness, other than the inventor, to the actual reduction to practice or it may consist of evidence of surrounding facts and circumstances independent of information received from the inventor." *Id.* One consequence of the independence requirement is that testimony of one co-inventor cannot

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be used to help corroborate the testimony of another. See, e.g., *Lacks Indus. v. McKechnie Vehicle Components USA, Inc.*, 322 F.3d 1335, 1350 (Fed. Cir. 2003) (opining that the Special Master rightly refused to accept cross-corroboration of oral testimony as being adequate).

Despite the importance of the independence requirement, however, "the law does not impose an impossible standard of 'independence' on corroborative evidence by requiring that every point of a reduction to practice be corroborated by evidence having a source totally independent of the inventor. [\*\*35] . . ." *Cooper v. Goldfarb*, 154 F.3d at 1330 (internal quotations omitted). Similarly, "it is not necessary to produce an actual over-the-shoulder observer. Rather, sufficient circumstantial evidence of an independent nature can satisfy the corroboration requirement." Id.

When an inventor claims a process for making a chemical compound rather than the compound itself, it is the successful reduction to practice of the process that must be corroborated, and not merely the successful production of the compound per se. Thus, spectral evidence that might be sufficient per se to corroborate a claim directed to the product will generally not be sufficient to corroborate a claim directed to the process, in the absence of some evidence to corroborate that the product was produced via that process.

## 2. Standard of Review

Whether or not corroboration exists is a question of fact, the district court's determination of which we review for clear error. This is true because "issues of conception and reduction to practice are questions of law predicated on subsidiary factual findings," *Eaton v. Evans*, 204 F.3d 1094, 1097 (Fed. Cir. 2000), and corroboration [\*\*36] is properly viewed as a subsidiary factual finding. See *Singh v. Brake*, 222 F.3d at 1368 (implying that corroboration is a question of fact by holding that "substantial evidence supports the Board's finding that this notebook entry alone was insufficient to corroborate Singh's testimony . . .") (emphasis added).

Before reviewing the determination of the court below, we note that it is true that corroboration is fundamentally about "credibility," see *supra* Discussion, Part C.1, and that in reviewing factual findings under the clear error standard, this court "gives great deference to the district court's decisions regarding credibility of witnesses." See *Ecolochem, Inc. v. S. Cal. Edison Co.*,

227 F.3d 1361, 1378-79 (Fed. Cir. 2000) (internal quotations omitted). Indeed, such deference is appropriately accorded to assessments of witness credibility because "only the trial judge can be aware of the variations in demeanor and tone of voice that bear so heavily on the listener's understanding of and belief in what is said." *Anderson v. Bessemer City*, 470 U.S. 564, 575, 105 S. Ct. 1504, 84 L. Ed. 2d 518 (1985).

Nonetheless, such deference is often [\*\*37] of little consequence in a corroboration inquiry because the *raison d'être* of the corroboration requirement is our refusal to base priority determinations on a court's uncorroborated assessments of a testifying inventor's credibility. Even the most credible inventor testimony is a *fortiori* required to be corroborated by independent [\*1172] evidence, which may consist of documentary evidence as well as the testimony of non-inventors. To the extent that a district court's finding of corroboration rests on its assessment of the credibility of non-inventor testimony, we apply the deferential standard of review stated in *Ecolochem*. To the extent that it rests, as it does here, on the district court's assessment of documentary, as opposed to testimonial evidence, we still apply clear error review; however, clear error is less difficult to establish.

## 3. Analysis

The parties in this case dispute whether or not there was adequate corroboration of the inventors' testimony that Medicem had actually reduced to practice the process of the claimed invention before Rolabo's effective filing date. Medicem put forward two principal types of corroborating evidence: documentary evidence generated [\*\*38] by inventors and that generated by non-inventors.<sup>9</sup>

<sup>9</sup> This patent bore a number of co-inventors, many of whom testified at trial. As we have noted above, the testimony of one inventor cannot be corroborated by the testimony of co-inventors.

In the first category, it produced a documented request for the analysis of a sample, purported to have been produced via the claimed synthetic route, which was sent by one co-inventor to another. Also in this category were the NMR spectral data obtained by the co-inventor pursuant to that request. These spectra were consistent with loratadine, and the accuracy of that chemical identification is not being challenged. Finally, this category includes the original laboratory notebook of

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co-inventor Dr. Rodriguez. In the second category, documentary evidence by non-inventors, there is the original laboratory notebook of former Medicem employee, and non-inventor, Lola Casas.

This court now turns to consider the corroborative value of the three principal pieces of potentially corroborative evidence: the NMR spectra, the notebooks of Medicem's inventors, and the notebook of non-inventor Casas. We note at the outset that the [\*\*39] problem with the dated NMR data is that at most they corroborate that the inventors were in possession of the chemical loratadine as of that date; they do not, in themselves, adequately corroborate the claimed process, as they do not establish whether the sample that was analyzed was actually produced by that process. If this case dealt with a claim to a composition of matter, rather than to a process, the NMR evidence might very well take on a different relevance in this regard. As far as the corroborative value of the inventors' notebooks is concerned, they were not witnessed, and they do not provide an "independent" source of authority on the issue of reduction to practice. Hence, they have minimum corroborative value.

It is clear to this court, therefore, that Medicem's claim of corroboration stands or falls with the modicum of additional corroborative value that can properly be assigned to non-inventor Casas' notebook.<sup>10</sup> However, Casas did not testify [\*1173] regarding the notebook or the genuineness of its contents. In addition, although Casas' notebook was dated, it was neither signed nor witnessed, and inventor Rodriguez testified that she and Casas had made entries in each [\*\*40] others' notebooks. Rodriguez characterized these occasions as not out of the ordinary. As a result, the district court was clearly reliant on the inventor to help to identify the author of specific entries made in Casas' notebook, because in a reduction to practice inquiry, only those passages of the unsigned, unwitnessed notebooks authored by non-inventor Casas could possess significant corroborative value. In addition, without testimony from Casas, the court lacked any non-inventor testimony regarding the genuineness of the notebook's contents.

<sup>10</sup> When an inventor attempts to offer into evidence the notebook of a non-inventor as evidence of corroboration, evidentiary issues might be implicated. For example, the notebook is likely to be hearsay, and if so, there may be an

issue as to whether or not it falls within an exception to the hearsay rule, such as the business record exception. Indeed, in *Chen v. Bouchard*, this court affirmed the decision of the Board of Patent Appeals and Interferences to exclude as inadmissible hearsay a non-inventor's notebooks, which had been offered to corroborate reduction to practice where, as in the instant case, the non-inventor did not testify. *347 F.3d 1299, 1308 (Fed. Cir. 2003)*.

[\*\*41] We also note that Medicem admitted fraudulently backdating certain documents relating to a purported 1995 reduction to practice. Even though the backdating of the 1995 documents was unrelated to the critical pages in Casas' notebook, which purport to establish a reduction to practice in 1996, the district court found that the credibility of the Medicem inventors was accordingly diminished.

Where a laboratory notebook authored by a non-inventor is offered into evidence pursuant to authentication by an inventor, where the author of the notebook has not testified at trial or otherwise attested to its authenticity, and where the notebook has not been signed or witnessed and has not been maintained in reasonable accordance with good laboratory practices sufficient to reasonably ensure its genuineness under the circumstances, then the corroborative value of the notebook is minimal. Given the facts of this case, Casas' notebook should therefore not be accorded much corroborative value. In view of the minimal corroborative value of the inventors' notebooks and the limited value of the NMR spectrum, we conclude that the evidence, evaluated as a whole under the rule of reason, is [\*\*42] insufficient as a matter of law to corroborate Medicem's reduction to practice.

The district court did not specifically address corroboration in its obviousness inquiry, a fact that might, in some circumstances, hamper our ability to conduct clear error review. Here, however, the facts of the case admit of only one conclusion as a matter of law, and we therefore decide the case without remanding to the district court for an explanation of why it implicitly found corroboration to be present. We hold that corroboration is absent and that the district court therefore erred in reaching its legal conclusion that Medicem had reduced its invention to practice in the spring of 1996. Accordingly, we reverse the district

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court's award of priority to Medicem.

No costs.

AFFIRMED-IN-PART, REVERSED-IN-PART

LEXSEE 425 U.S. 273

**SAKRAIDA v. AG PRO, INC.**

**No. 75-110**

**SUPREME COURT OF THE UNITED STATES**

**425 U.S. 273; 96 S. Ct. 1532; 47 L. Ed. 2d 784; 1976 U.S. LEXIS 146; 189 U.S.P.Q.  
(BNA) 449**

**Argued March 3, 1976  
April 20, 1976**

**PRIOR HISTORY:** CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE FIFTH CIRCUIT

**SUMMARY:**

An action was instituted in the United States District Court for the Western District of Texas for alleged infringement of the plaintiff's combination patent covering a water flush system to remove cow manure from the floor of a dairy barn. All of the individual elements of the combination patent were old in the dairy business, and the only claimed inventive feature was the provision for abrupt release of water from storage tanks or pools directly onto the barn floor to cause the flow of a sheet of water washing all animal waste into drains within minutes without supplemental hand labor as was required under the prior art. After the District Court's initial grant of summary judgment for the defendant had been reversed by the *United States Court of Appeals for the Fifth Circuit* (437 F2d 99), the District Court, upon trial on remand, entered judgment for the defendant on the ground that the patent was invalid for obviousness under 103 of the Patent Act (35 USCS 103), which provides that a patent may not be obtained if the subject matter would have been obvious at the time the invention was made to a person having ordinary skill in the applicable art. The Court of Appeals again reversed and held the patent valid (474 F2d 167), and on rehearing, remanded the case for entry of a judgment holding the patent valid, unless the defendant established a case for a new trial on the basis of newly discovered evidence (481 F2d 668). The District Court ordered a new trial, but the Court of Appeals again reversed, reaffirming its prior

determination of patent validity and holding that the record did not support the grant of a new trial (512 F2d 141).

On certiorari, the United States Supreme Court reversed. In an opinion by Brennan, J., expressing the unanimous view of the court, it was held that the plaintiff's patent was invalid for obviousness under 103 of the Patent Act, since all of the individual elements of the patent were old in the dairy business and the combination of the old elements to produce an abrupt release of water directly onto the barn floor did not result in a new or different function or an effect greater than the sum of the several effects taken separately, the combination of old elements thus falling under the head of the work of a skillful mechanic, not that of an inventor.

**LAWYERS' EDITION HEADNOTES:**

[\*\*\*LEdHN1]

PATENTS §40

validity -- dairy barn flush system -- obviousness --

Headnote:[1A][1B][1C][1D]

A combination patent covering a water flush system to remove cow manure from the floor of a dairy barn--the only claimed inventive feature being the provision for abrupt release of water from storage tanks or pools directly onto the barn floor to cause the flow of a sheet of water washing animal waste into drains within minutes without supplemental hand labor as was required under prior art--is invalid for obviousness under 103 of the Patent Act (35 USCS 103) even though it produces a

425 U.S. 273, \*; 96 S. Ct. 1532, \*\*;  
47 L. Ed. 2d 784, \*\*\*LEdHN1; 1976 U.S. LEXIS 146

desired result in a more convenient, cheaper, and faster way than under the prior art, and even though it enjoys commercial success, where (1) all of the individual elements of the combination were old in the dairy business, and (2) the combination of the old elements to produce an abrupt release of water directly onto the barn floor did not result in a new or different function or an effect greater than the sum of the several effects taken separately, and fell under the head of the work of a skillful mechanic, not that of an inventor.

[\*\*\*LEdHN2]

PATENTS §17

necessity for invention -- mechanical skill --

Headnote:[2]

The Constitution requires that there be some "invention" to be entitled to patent protection; unless more ingenuity and skill are required than are possessed by an ordinary mechanic acquainted with the business, there is an absence of that degree of skill and ingenuity which constitute essential elements of every invention.

[\*\*\*LEdHN3]

PATENTS §19.1

TRIAL §154

patent validity -- obviousness --

Headnote:[3]

The ultimate test of patent validity is one of law, but resolution of the issue of obviousness under 103 of the Patent Act (*35 USCS 103*)--which provides that a patent may not be obtained if the subject matter would have been obvious at the time the invention was made to a person having ordinary skill in the applicable art--necessarily entails basic factual inquiries to determine (1) the scope and content of the prior art, (2) the differences between the prior art and the claims at issue, and (3) the level of ordinary skill in the pertinent art.

[\*\*\*LEdHN4]

EVIDENCE §1002

sufficiency -- patent --

Headnote:[4]

In an action for alleged infringement of a combination patent covering a water flush system to remove cow manure from the floor of a dairy barn, the evidence is sufficient to support the Federal District Court's finding that each of the component parts of the patent were old and well-known throughout the dairy industry prior to the date of the filing of the application for the patent in question, where the scope of the prior art is shown by prior patents, prior art publications, affidavits of people having knowledge of prior flush systems analogous to the patent in question, and the testimony of a dairy operator with 22 years experience who described flush systems he had seen on visits to dairy farms throughout the country.

[\*\*\*LEdHN5]

PATENTS §40

aggregation of old elements --

Headnote:[5]

Courts should scrutinize combination patent claims with a care proportioned to the difficulty and improbability of finding invention in an assembly of old elements.

[\*\*\*LEdHN6]

PATENTS §40

aggregation of old elements --

Headnote:[6]

A combination arranging old elements with each performing the same function it had been known to perform, although perhaps producing a more striking result than in previous combinations, is not patentable under standards appropriate for a combination patent.

[\*\*\*LEdHN7]

PATENTS §17

necessity of invention -- commercial success --

Headnote:[7]

Benefits in producing a desired result in a more

425 U.S. 273, \*; 96 S. Ct. 1532, \*\*;  
47 L. Ed. 2d 784, \*\*\*; 1976 U.S. LEXIS 146

convenient, cheaper, and faster way than under the prior art, and commercial success, will not, without invention, make patentability.

## SYLLABUS

Respondent's patent covering a water flush system to remove cow Smanure from the floor of a dairy barn *held* invalid for obviousness, it being a combination patent all the elements of which are old in the dairy business and were well known before the filing of the patent application. The system's exploitation of the principle of gravity to effect the abrupt release of water "did not produce a 'new or different function'... within the test of validity of combination patents." *Anderson's-Black Rock v. Pavement Co.*, 396 U.S. 57, 60. Pp. 274-283.I

512 F. 2d 141, reversed.

BRENNAN, J., delivered the opinion for a unanimous Court.

**COUNSEL:** *Stephen B. Tatem, Jr.*, argued the cause for petitioner. With him on the briefs was *James F. Hulse*.

*J. Pierre Kolisch* argued the cause for respondent. With him on the brief was *John W. Stuart*. \*

\* *Mary Helen Sears* filed a brief for the Texas Farmers Union as *amicus curiae* urging reversal.

*Helen W. Nies, Donald R. Dunner, and David N. Webster* filed a brief for the Bar Association of the District of Columbia as *amicus curiae*.

**JUDGES:** BURGER, BRENNAN, STEWART, WHITE, MARSHALL, BLACKMUN, POWELL, REHNQUIST, and STEVENS.

## OPINION BY: BRENNAN

### OPINION

[\*273] [\*\*\*786] [\*\*1533] MR. JUSTICE BRENNAN delivered the opinion of the Court.

Respondent Ag Pro, Inc., filed this action against petitioner Sakraida on October 8, 1968, in the District Court for the Western District of [\*\*\*787] Texas for

infringement of United States Letters Patent 3,223,070, entitled "Dairy [\*274] Establishment," covering a water flush system to remove cow manure from the floor of a dairy barn. The patent was issued December 14, 1965, to Gribble and Bennett, who later assigned it to respondent.

[\*\*\*LEdHR1A] [1A]The District Court's initial grant of summary judgment for petitioner was reversed by the Court of Appeals for the Fifth Circuit. 437 F. 2d 99 (1971). After a trial on remand, the District Court again entered a judgment for petitioner. The District Court held that the patent "does not constitute invention, is not patentable, and is not a valid patent, it being a combination patent, all of the elements of which are old in the dairy business, long prior to 1963, and [\*\*1534] the combination of them as described in the said patent being neither new nor meeting the test of non-obviousness." The Court of Appeals again reversed and held the patent valid. 474 F. 2d 167 (1973). On rehearing, the court remanded "with directions to enter a judgment holding the patent valid, subject, however, to... consideration of a motion under Rule 60 (b)(2), F.R. Civ. P., to be filed in the District Court by the [petitioner] Sakraida on the issue of patent validity based on newly discovered evidence." 481 F. 2d 668, 669 (1973). The District Court granted the motion and ordered a new trial. The Court of Appeals again reversed, holding that the grant of the motion was error, because "the record on the motion establishes that [petitioner] failed to exercise due diligence to discover the new evidence prior to entry of the former judgment." 512 F. 2d 141, 142 (1975). The Court of Appeals further held that "[o]ur prior determination of patent validity is reaffirmed." *Id.*, at 144. We granted certiorari. 423 U.S. 891 (1975). We hold that the Court of Appeals erred in holding the patent valid and also in reaffirming its determination of patent validity. We therefore reverse and direct the reinstatement of the District [\*275] Court's judgment for petitioner, and thus we have no occasion to decide whether the Court of Appeals properly found that petitioner had not established a case for a new trial under Rule 60 (b)(2).

Systems using flowing water to clean animal wastes from barn floors have been familiar on dairy farms since ancient times.<sup>1</sup> The District Court found, and respondent concedes, that none of the 13 elements of the Dairy Establishment combination is new,<sup>2</sup> [\*\*\*788] and many of those [\*276] elements, including [\*\*1535] storage of the water in tanks or pools, appear in at least

425 U.S. 273, \*276; 96 S. Ct. 1532, \*\*1535;  
47 L. Ed. 2d 784, \*\*\*788; 1976 U.S. LEXIS 146

six prior patented systems.<sup>3</sup> The prior art involved spot delivery of water from tanks or pools [\*277] to the barn floor by means of high pressure hoses or pipes. That system required supplemental hand labor, using tractor blades, shovels, and brooms, and cleaning by these methods took several hours. The only claimed inventive feature of the Dairy Establishment combination of old elements is the provision for abrupt release of the water from the tanks or pools directly onto the barn floor, which causes the flow of a sheet of water that washes all animal waste into drains within minutes and requires no supplemental hand labor. As an expert witness for respondent testified concerning the effect of Dairy Establishment's combination: "[W]ater at the bottom has more friction than this water on the top and it keeps moving ahead and as this water keeps moving ahead we get a rolling action of this water which produced the cleaning action.... You do not get this in a hose.... [U]nless that water is continuously directed toward the cleaning area the cleaning action almost ceases instantaneously...."<sup>4</sup>

1 Among the labors of Hercules is the following:

"Heracles now set out to perform his fifth Labour, and this time his task was to cleanse the stables of Augeas in a single day. Augeas was a rich king of Elis, who had three thousand cattle. At night the cattle always stood in a great court surrounded with walls, close to the king's palace, and as it was quite ten years since the servants had cleaned it out, there was enough refuse in the court to build up a high mountain. Heracles went to Augeas and asked if he would give him the tenth part of his flocks if he thoroughly cleansed his stables in a single day. The king looked upon this as such an absolutely impossible feat that he would not have minded promising his kingdom as a reward for it, so he laughed and said, 'Set to work, we shall not quarrel about the wages,' and he further promised distinctly to give Heracles what he asked, and this he did in the presence of Phyleus, his eldest son, who happened to be there. The next morning Heracles set to work, but even his strong arms would have failed to accomplish the task if they had not been aided by his mother-wit. He compelled a mighty torrent to work for him, but you would hardly guess how he did it. First he opened great gates on two opposite sides of the court, and then he went to the stream,

and when he had blocked up its regular course with great stones, he conducted it to the court that required to be cleansed, so that the water streamed in at one end and streamed out at the other, carrying away all the dirt with it. Before evening the stream had done its work and was restored to its usual course." C. Witt, *Classic Mythology* 119-120 (1883).

2 The District Court found as follows respecting Claims 1 and 3, the only claims involved in the case:

"1. I find that the 'dairy establishment' as described in United States Letters Patent 3,223,070 is composed of 13 separate items, as follows:

"(a) '... a smooth, evenly contoured, paved surface forming a floor providing a walking surface....'

"(b) '... drain means for draining wash water from such floor opening to the top of the floor.'

"(c) '... said smooth, evenly contoured surface which forms such floor sloping toward said drain....'

"(d) '... multiple rest areas with individual stalls for each cow and with each of said stalls having a bottom which is also a smooth pavement....'

"(e) '... which is disposed at an elevation above the paved surface forming the floor....'

"(f) '... said stalls being dimensioned so that a cow can comfortably stand or lie in the stall, but offal from the cow falls outside the stall bottom and onto the floor providing the walking surface in the barn....'

"(g) '... said barn further including defined feeding areas having feeding troughs....'

"(h) '... a cow-holding area.'

"(i) '... a milking area.'

425 U.S. 273, \*277; 96 S. Ct. 1532, \*\*1535;  
47 L. Ed. 2d 784, \*\*\*788; 1976 U.S. LEXIS 146

"(j) '... a transfer area all bottomed with the walking surface forming said floor in the barn....'

"(k) '... and floor washing means for washing the floor providing the walking surface in the barn where said floor bottom, said feeding, holding, milking and transfer areas operable to send wash water flowing over the floor with such water washing any cow offal thereon into the said drain means, said floor washing means including means located over a region of said floor which is uphill from said drain means constructed to collect water as a pool above said floor and operable after such collection of water as a pool to dispense the water as a sheet of water over said floor.'

"(l) A tank on a mounting, so that it can be tilted, and the water poured out to cascade on the floor to form a sheet.

"(m) A floor-washing means comprising a dam for damming or collecting water as a pool directly on the floor, which such dam abruptly openable to send water cascading as a sheet over the floor towards the drain.

"2. I further find that each of the items above-described were not new, but had been used in the dairy business prior to the time the application for the said Gribble patent, made the subject of this action, had been filed in the Patent Office of the United States on November 5, 1963."

### 3 The District Court found:

"Many of the items going to make up Plaintiff's claim for a patent were disclosed in prior patents, known respectively as the McCornack patent, the Holz patent, the Ingraham patent, the Kreutzer patent, the Bogert patent, and the Luks patent; and that the statements of the Examiner's opinions refusing to issue a patent are true as to all items there stated to be covered in prior patents or publications."

### 4 This witness further testified:

"[W]ater has energy and it can be used in many different ways. In a hose the energy is used

by impact, under pressure, external force that is applied to this pressure - to this water, whereas the water that comes down as a sheet or wall of water has built in energy because of its elevation and as this water is released it does the same thing water does in a flooded stream. As this water - I will try to make this clear, and I hope I can, on the surface of this pavement there are these piles of manure droppings. This pavement is smooth and this water moves down over this manure. The water at the bottom has more friction than this water on the top and it keeps moving ahead and as this water keeps moving ahead we get a rolling action of this water which produced the cleaning action. That is the key to this method of cleaning. You do not get this in a hose. You do not get it in a gutter as has been used in the past. I might just mention a little bit about the hose. This squirting water on a floor - probably have done it on our own side-walks or walkways, and I just mention that, that unless that water is continuously directed towards the cleaning area the cleaning action almost ceases instantaneously. Now the movie that was shown earlier very dramatically illustrated that point. The cleaning action - as soon as the hoses moved to one side the cleaning action ceased here and that is why this hose was moved back and forth, to drive this stuff on down to where we want it."

[\*278] [\*\*\*789] The District Court found that "[n]either the tank which holds the water, nor the means of releasing the water quickly is new, but embrace[s] tanks and doors which have long been known," and further that "their use in this connection is one that is obvious, and the patent in that respect is lacking in novelty. The patent does not meet the non-obvious requirements of the law." The District Court therefore held that Dairy Establishment "may be relevant [\*\*1536] to commercial success, but not to invention," because the combination "was reasonably obvious to one with ordinary skill in the art." Moreover, even if the combination filled a "long-felt want and... has enjoyed commercial success, those matters, without invention, will not make patentability." Finally, the District Court concluded: "[T]o those skilled in the art, the use of the old elements in combination was not an invention by the obvious-nonobvious standard. Even [\*279] though the dairy barn in question attains the posture of a successful venture, more than that is needed for invention."<sup>5</sup> The

425 U.S. 273, \*279; 96 S. Ct. 1532, \*\*1536;  
47 L. Ed. 2d 784, \*\*\*789; 1976 U.S. LEXIS 146

Court of Appeals disagreed with the District Court's conclusion on the crucial issue of obviousness.

5 The court also concluded that "while the combination of old elements may have performed a useful function, it added nothing to the nature and quality of dairy barns theretofore used."

[\*\*\*LEdHR2] [2]It has long been clear that the Constitution requires that there be some "invention" to be entitled to patent protection. *Dann v. Johnston*, ante, p. 219. As we explained in *Hotchkiss v. Greenwood*, 11 How. 248, 267 (1851): "[U]nless more ingenuity and skill... were required... than were possessed by an ordinary mechanic acquainted with the business, there was an absence of that degree of skill and ingenuity which constitute essential elements of every invention. In other words, the improvement is the work of the skillful mechanic, not that of the inventor." This standard was enacted in 1952 by Congress in 35 U.S.C. § 103 "as a codification of judicial precedents... with congressional directions that inquiries into the obviousness of the subject matter sought to be patented are a prerequisite to patentability." *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966). Section 103 provides: S

"A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject [\*\*\*790] matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made."I

[\*280] [\*\*\*LEdHR3] [3]The ultimate test of patent validity is one of law, *Great A. & P. Tea Co. v. Supermarket Corp.*, 340 U.S. 147, 155 (1950), but resolution of the obviousness issue necessarily entails several basic factual inquiries, *Graham v. John Deere Co.*, *supra*, at 17. S

"Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved." *Ibid*.I

[\*\*\*LEdHR1B] [1B]The Court of Appeals concluded that "the facts presented at trial clearly do not support [the District Court's] finding of obviousness under the three-pronged *Graham* test...." 474 F. 2d, at 172. We disagree and hold that the Court of Appeals erroneously set aside the District Court's findings.

[\*\*\*LEdHR4] [4] [\*\*\*LEdHR5] [5]The scope of the prior art was shown by prior patents, prior art publications, affidavits of people having knowledge of prior flush systems analogous to respondent's, and the testimony of a dairy operator with 22 years of experience who described flush systems he had seen on visits to dairy farms throughout the country. Our independent examination of that evidence persuades us of its sufficiency to support the District Court's finding "as a fact that each and all of the component parts of this patent... were old and well-known throughout the dairy industry long prior to the date of the filing of the application for the Gribble patent.... What Mr. Gribble referred to... as the essence of the [\*\*1537] patent, to-wit, the manure flush system, was old, various means for flushing manure from dairy barns having been used long before the filing of the application...." <sup>6</sup> Indeed, [\*281] respondent admitted at trial "that the patent is made up of a combination of old elements" and "that all elements are individually old...." Accordingly, the District Court properly followed our admonition in *Great A. & P. Tea Co. v. Supermarket Corp.*, *supra*, at 152: "Courts should scrutinize combination patent claims with a care proportioned to the difficulty and improbability of finding invention in an assembly of old elements...." [\*\*\*791] A patent for a combination which only unites old elements with no change in their respective functions... obviously withdraws what already is known into the field of its monopoly and diminishes the resources available to skillful men...."

6 The court stated:

"I therefore find as a fact that each and all of the component parts of this patent as listed under the applicant's claims set out in said patent, were old and well-known throughout the dairy industry long prior to the date of the filing of the application for the Gribble patent. I further find that what Mr. Gribble referred to in his deposition as the essence of the patent, to-wit, the manure flush system, was old, various means for flushing manure from dairy barns having been used long

425 U.S. 273, \*281; 96 S. Ct. 1532, \*\*1537;  
47 L. Ed. 2d 784, \*\*\*791; 1976 U.S. LEXIS 146

before the filing of the application for the Gribble patent, the general idea in that connection being a hard surfaced sloping floor onto which the cows' offal was dropped, and some system of introducing water in sufficient quantities and force onto said floor to wash the offal therefrom, with a ditch or drain to carry the offal so washed away from the barn, either into a manure container or otherwise."

The Court of Appeals recognized that the patent combined old elements for applying water to a conventional sloped floor in a dairy barn equipped with drains at the bottom of the slope and that the purpose of the storage tank - to accumulate a large volume of water capable of being released in a cascade or surge - was equally conventional. *474 F. 2d, at 169.* It concluded, however, that the element lacking in the prior art was any evidence of an arrangement of the old elements to effect the abrupt release of a flow of water to wash animal wastes from the floor of a dairy barn. *Ibid.* Therefore, [\*282] "although the [respondent's] flush system does not embrace a complicated technical improvement, it does achieve a synergistic result through a novel combination." *Id., at 173.*

[\*\*\*LEdHR1C] [1C] [\*\*\*LEdHR6] [6] We cannot agree that the combination of these old elements to produce an abrupt release of water directly on the barn floor from storage tanks or pools can properly be characterized as synergistic, that is, "result[ing] in an effect greater than the sum of the several effects taken separately." *Anderson's-Black Rock v. Pavement Co.*, 396 U.S. 57, 61 (1969). Rather, this patent simply arranges old elements with each performing the same function it had been known to perform, although perhaps producing a more striking result than in previous combinations. Such combinations are not patentable under standards appropriate for a combination patent. *Great A. & P. Tea Co. v. Supermarket Corp.*, *supra*; *Anderson's-Black Rock v. Pavement Co.*, *supra*. Under those authorities this assembly of old elements that delivers water directly rather than through pipes or hoses to the barn floor falls under the head of "the work of the skillful mechanic, not that of the inventor." *Hotchkiss v. Greenwood*, 11 How.,

*at 267.* Exploitation of the principle of gravity adds nothing to the sum of useful knowledge where there is no change in the respective functions of the elements of the combination; this particular use of the assembly of old elements would be obvious to any person skilled in the art of mechanical application. See *Dann v. Johnston*, *ante*, at 229-230.

[\*\*\*LEdHR1D] [1D] [\*\*\*LEdHR7] [7] Though doubtless a matter of great convenience, producing a desired result in a cheaper and faster way, and enjoying commercial success, Dairy Establishment "did not produce a 'new or different' [\*\*1538] function'... within the test of validity of combination patents." *Anderson's-Black Rock v. Pavement Co.*, *Supra*, at 60. These [\*283] desirable benefits "without invention will not make patentability." *Great A. & P. Tea Co. v. Supermarket Corp.*, 340 U.S., at 153. See *Dann v. Johnston*, *ante*, at 230 n. 4.

*Reversed.*

## REFERENCES

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35 USCS 103

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## Annotation References:

Application and effect of 35 USCS 103, requiring nonobvious subject matter, in determining validity of patents. 23 ALR Fed 326.

LEXSEE 383 U.S. 39

**UNITED STATES v. ADAMS ET AL.**

**No. 55**

**SUPREME COURT OF THE UNITED STATES**

**383 U.S. 39; 86 S. Ct. 708; 15 L. Ed. 2d 572; 1966 U.S. LEXIS 2754; 148 U.S.P.Q.  
(BNA) 479**

**October 14, 1965, Argued  
February 21, 1966, Decided**

**PRIOR HISTORY:** CERTIORARI TO THE UNITED STATES COURT OF CLAIMS.

**DISPOSITION:** *165 Ct. Cl. 576, 330 F.2d 622,* affirmed.

**SUMMARY:**

Persons having an interest in a patent on a nonrechargeable electrical battery using magnesium and cuprous chloride electrodes in a water electrolyte sued the United States in the United States Court of Claims for infringement and breach of an implied contract to pay compensation for use of the invention. The Court of Claims held the patent valid and infringed (*165 Ct Cl 576, 330 F2d 622*), and about 6 months later, on a motion to amend the judgment, it held that no contract had been established.

On certiorari to review only the patent-validity issue, the Supreme Court of the United States affirmed. In an opinion by Clark, J., expressing the views of seven members of the Court, it was held that (1) the 90-day period for filing the petition for certiorari began with the date of decision on the contract issue, and (2) the invention was both novel and nonobvious.

White, J., dissented without opinion.

Fortas, J., did not participate.

**LAWYERS' EDITION HEADNOTES:**

[\*\*\*LEdHN1]

ERROR §882(2)

time for filing petition for certiorari --

Headnote:[1]

In a suit against the United States in the Court of Claims for patent infringement and breach of an implied contract to pay compensation for the use of the invention, in which the trial commissioner held that the patent was valid and infringed in part but that no contract had been established, the Court of Claims adopted these findings but initially reached only the patent questions and decided the contract claims on a timely motion to amend the judgment, the 90-day period for filing a petition of certiorari with the Supreme Court begins with the date of decision on the contract issue, since the Government's liability is inextricably linked with the alleged contract action which was not determined until the latter judgment.

[\*\*\*LEdHN2]

ERROR §882(2)

time for filing petition for certiorari --

Headnote:[2A][2B]

The 90-day period for filing a petition for certiorari with the Supreme Court runs from the date of the order overruling a timely motion to amend the judgment.

[\*\*\*LEdHN3]

ERROR §963

certiorari -- service --

383 U.S. 39, \*; 86 S. Ct. 708, \*\*;  
15 L. Ed. 2d 572, \*\*\*LEDHN3; 1966 U.S. LEXIS 2754

Headnote:[3]

There is no merit in a contention that on a petition for certiorari the United States failed to comply with *Supreme Court Rules 21(1)* and 33 as to service, since the requirement is not jurisdictional, no prejudice resulted, and the failure was inadvertent.

[\*\*\*LEDHN4]

PATENTS §18

patentability --

Headnote:[4]

Novelty and nonobviousness, as well as utility, are separate tests of patentability and all must be satisfied in a valid patent.

[\*\*\*LEDHN5]

PATENTS §123

claims -- construction with specifications --

Headnote:[5]

While the claims of a patent limit the invention, and specifications cannot be used to expand the patent monopoly, the claims are to be construed in the light of the specifications, and both are to be read with a view to ascertaining the invention.

[\*\*\*LEDHN6]

PATENTS §69

novelty -- battery --

Headnote:[6]

A nonrechargeable electrical battery consisting of a magnesium electrode, a cuprous chloride electrode, and an electrolyte of either plain or salt water, is novel where a previous foreign patent claiming magnesium as an electrode specified an acid electrolyte and was both dangerous and inoperable.

[\*\*\*LEDHN7]

PATENTS §60

novelty -- previous unsuccessful invention --

Headnote:[7]

An inoperable invention or one which fails to achieve its intended result does not negative novelty, even though a foreign patent has been issued on it.

[\*\*\*LEDHN8]

PATENTS §27

patentability -- equivalence --

Headnote:[8]

There is no equivalency negating the patentability of a nonrechargeable electrical battery using magnesium and cuprous chloride electrodes on the ground that such electrodes were merely equivalent substitutions for zinc and silver chloride electrodes where the operating characteristics were different and therefore nonequivalent and the previous batteries were of a completely different type.

[\*\*\*LEDHN9]

PATENTS §19.1

nonobviousness -- combining known elements --

Headnote:[9]

A nonrechargeable electrical battery consisting of a magnesium electrode, a cuprous chloride electrode, and an electrolyte of plain or salt water, is nonobvious where its operating characteristics were unexpected and surpassed existing wet batteries, and to combine the elements known to the prior art, a person reasonably skilled in the prior art must ignore that batteries continuing to operate on an open circuit and which heated in normal use were not practical and that water-activated batteries were successful only when combined with electrolytes detrimental to the use of magnesium.

[\*\*\*LEDHN10]

PATENTS §19.1

nonobviousness -- disadvantages in old devices --

Headnote:[10]

While one who merely finds new uses for old inventions by shutting his eyes to their prior

383 U.S. 39, \*; 86 S. Ct. 708, \*\*;  
15 L. Ed. 2d 572, \*\*\*LEdHN10; 1966 U.S. LEXIS 2754

disadvantages does not thereby discover a patentable innovation, known disadvantages in old devices which would naturally discourage the search for new inventions may be taken into account in determining nonobviousness.

[\*\*\*LEdHN11]

#### PATENTS §19.1

##### obviousness -- factors --

Headnote:[11]

As bearing on the question of the obviousness of an invention, the court may consider that noted experts expressed disbelief in the invention, that several of the same experts subsequently recognized the significance of the invention and some even patented improvements on the same system, that in a crowded art replete with a century and a half of advancement the Patent Office found not one reference to cite against the invention, and that as against the subsequently issued improvement patents, the Patent Office found but three references prior to the invention in question, none of which was relied on against it.

#### SYLLABUS

Respondents sued the Government under 28 U. S. C. § 1498 charging infringement and breach of contract to compensate for use of a wet battery on which a patent had been issued to respondent Adams. The battery consisted of a magnesium electrode (anode) and a cuprous chloride electrode (cathode) placed in a container with water to be supplied as the electrolyte, providing a constant voltage and current without the use of acids. Despite initial disbelief in the battery's efficacy by government experts to whose attention Adams brought his invention the Government ultimately (but without notifying Adams) put the battery to many uses. In opposition to respondents' suit the Government claimed the device unpatentable because the use of magnesium and cuprous chloride to perform the function shown by Adams had been previously well known in the art and their combination represented no significant change compared to the prior art wet battery designs such as those using a zinc anode and silver chloride cathode for which magnesium and cuprous chloride were known substitutes. The Court of Claims adopted the Trial Commissioner's finding that the patent was valid and

infringed by some of the accused devices. Six months later, following respondents' motion to amend the judgment, that court found no breach of contract. More than 90 days after the initial judgment but less than that period after the contract decision, the Government sought a time extension for review as to the issue of patent validity. Such review was later granted though service on respondents of the petition for writ of certiorari was delayed beyond the time prescribed by this Court's rules. *Held:*

1. The petition for certiorari was timely, since the 90-day filing period commenced, not with the initial judgment, but with the judgment on the contract issue; nor did failure to comply with the Court's rules as to service of the petition bar this review since the service requirements therein are not jurisdictional, and no prejudice resulted from the Government's inadvertent failure to meet those requirements. Pp. 41-42.
2. The Adams patent is valid since it satisfied the separate tests of novelty, nonobviousness, and utility required for issuance of a patent. *Graham v. John Deere Co., ante*, p. 1. Pp. 48-52.
3. The Adams battery was novel. Pp. 48-51.
  - (a) The fact that it was water-activated set it apart from the prior art. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, distinguished. Pp. 48-50.
  - (b) The combination of magnesium and cuprous chloride was novel in the light of the prior art. P. 50.
  - (c) The use of magnesium for zinc and cuprous chloride for silver chloride did not involve merely equivalent substitutes, as is evidenced by the fact that the Adams battery had different operating characteristics from those of the batteries relied upon by the Government. Pp. 50-51.
4. The Adams battery was nonobvious. Pp. 51-52.
  - (a) Though each of the battery's elements was well known in the prior art, to combine them as Adams did required that a person reasonably skilled in that art ignore that open-circuit batteries which heated in normal use were not practical and that water-activated batteries were successful only when combined with electrolytes harmful to the use of magnesium. Pp. 51-52.

383 U.S. 39, \*; 86 S. Ct. 708, \*\*;  
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(b) Noted experts had expressed initial disbelief in the Adams battery. P. 52.

(c) In a crowded art replete with a century and a half of advance the Patent Office could find no reference to cite against the Adams application. P. 52.

**COUNSEL:** Assistant Attorney General Douglas argued the cause for the United States. With him on the brief were Acting Solicitor General Spritzer, Sherman L. Cohn and Edward Berlin.

John A. Reilly argued the cause and filed a brief for respondents.

**JUDGES:** Warren, Harlan, Brennan, Black, Stewart, Clark, White, Douglas; Fortas took no part in the consideration or decision of this case.

#### OPINION BY: CLARK

#### OPINION

[\*40] [\*\*\*574] [\*\*709] MR. JUSTICE CLARK delivered the opinion of the Court.

This is a companion case to No. 11, *Graham v. John Deere Co.*, decided this day along with Nos. 37 and 43, *Calmar, Inc. v. Cook Chemical Co.* and *Colgate-Palmolive Co. v. Cook Chemical Co.* The United States seeks review of a judgment of the Court of Claims, holding valid and infringed a patent on a wet battery issued to [\*41] Adams. This suit under 28 U. S. C. § 1498 (1964 ed.) was brought by Adams and others holding an interest in the patent against the Government charging both infringement and breach of an implied contract to pay compensation for the use of the invention. The Government challenged the validity of the patent, denied that it had been infringed or that any contract for its use had ever existed. The Trial Commissioner held that the patent was valid and infringed in part but that no contract, express or implied, had been established. The Court of Claims adopted these findings, initially reaching only the patent questions, 165 Ct. Cl. 576, 330 F.2d 622, but subsequently, on respondents' motion to amend the judgment, deciding the contract claims as well. 165 Ct. Cl., at 598. The United States sought certiorari on the patent validity issue only. We granted the writ, along with the others, in order to settle the important issues of patentability presented by the four cases. 380 U.S. 949. We affirm.

#### I.

[\*\*\*LEdHR1] [1] [\*\*\*LEdHR2A] [2A]While this case is controlled on the merits by No. 11, *Graham, ante*, p. 1, respondents have raised threshold issues as to our jurisdiction which require separate handling. They say that the petition for certiorari came too late, contending that the 90-day period for filing began with the date of the initial judgment rather than the date of the decision on the contract issue, citing *F. T. C. v. Minneapolis-Honeywell Co.*, 344 U.S. 206 (1952). We cannot agree; first, because that case did not involve a timely motion to amend the judgment<sup>1</sup> and, secondly, because here the Government's liability was inextricably [\*42] linked with the alleged contract action which was not determined until the latter judgment.

[\*\*\*LEdHR2B] [2B]

1 Where a timely motion is filed, the time in such cases runs from the date of the order overruling the motion. See *Department of Banking v. Pink*, 317 U.S. 264, 267 (1942); *United States v. Crescent Amusement Co.*, 323 U.S. 173, 177 (1944); *Forman v. United States*, 361 U.S. 416, 426 (1960).

[\*\*\*LEdHR3] [3]Nor is there merit in respondents' contention that the Government failed to comply with the requirements of our Rules 21 (1) and 33 as to service, since these requirements are not jurisdictional, no [\*575] prejudice resulted and the failure was inadvertent.

We turn now to the merits.

#### II.

##### *The Patent in Issue and Its Background.*

The patent under consideration, U.S. No. 2,322,210, was issued in 1943 upon an application filed in December 1941 by Adams. It relates to a nonrechargeable, as opposed to a storage, electrical battery. Stated simply, the battery comprises two electrodes -- one made of magnesium, the other of cuprous chloride -- which are placed in a container. The electrolyte, or battery fluid, used may be either plain or salt water.

The specifications of the patent state that the object of the invention is to provide constant voltage and current

383 U.S. 39, \*42; 86 S. Ct. 708, \*\*709;  
15 L. Ed. 2d 572, \*\*\*575; 1966 U.S. LEXIS 2754

without the use of acids, conventionally employed in storage batteries, and without the generation of dangerous fumes. Another object is "to provide a battery which is relatively light in weight with respect to capacity" and which "may be [\*\*710] manufactured and distributed to the trade in a dry condition and rendered serviceable by merely filling the container with water." Following the specifications, which also set out a specific embodiment of the invention, there appear 11 claims. Of these, principal reliance has been placed upon Claims 1 and 10, which read:

"1. A battery comprising a liquid container, a magnesium electropositive electrode inside the container and having an exterior terminal, a fused cuprous chloride electronegative electrode, and a terminal connected with said electronegative electrode."

[\*43] "10. In a battery, the combination of a magnesium electropositive electrode, and an electronegative electrode comprising cuprous chloride fused with a carbon catalytic agent."

For several years prior to filing his application for the patent, Adams had worked in his home experimenting on the development of a wet battery. He found that when cuprous chloride and magnesium were used as electrodes in an electrolyte of either plain water or salt water an improved battery resulted.

The Adams invention was the first practical, water-activated, constant potential battery which could be fabricated and stored indefinitely without any fluid in its cells. It was activated within 30 minutes merely by adding water. Once activated, the battery continued to deliver electricity at a voltage which remained essentially constant regardless of the rate at which current was withdrawn. Furthermore, its capacity for generating current was exceptionally large in comparison to its size and weight. The battery was also quite efficient in that substantially its full capacity could be obtained over a wide range of currents. One disadvantage, however, was that once activated the battery could not be shut off; the chemical reactions in the battery continued even though current was not withdrawn. Nevertheless, these chemical reactions were highly exothermic, liberating large quantities of heat during operation. As a result, the battery performed with little effect on its voltage or current in very low temperatures. Relatively high temperatures would not damage the battery. Consequently, the battery was operable from 65 degrees

below zero Fahrenheit to 200 degrees Fahrenheit. See findings at *165 Ct. Cl.*, at 591-592, 330 F.2d, at 632.

[\*\*\*576] Less than a month after filing for his patent, Adams brought his discovery to the attention of the Army and Navy. Arrangements were quickly made for demonstrations [\*44] before the experts of the United States Army Signal Corps. The Signal Corps scientists who observed the demonstrations and who conducted further tests themselves did not believe the battery was workable. Almost a year later, in December 1942, Dr. George Vinal, an eminent government expert with the National Bureau of Standards, still expressed doubts. He felt that Adams was making "unusually large claims" for "high watt hour output per unit weight," and he found "far from convincing" the graphical data submitted by the inventor showing the battery's constant voltage and capacity characteristics. He recommended, "Until the inventor can present more convincing data about the performance of his [battery] cell, I see no reason to consider it further."

However, in November 1943, at the height of World War II, the Signal Corps concluded that the battery was feasible. The Government thereafter entered into contracts with various battery companies for its procurement. The battery was found adaptable to many uses. Indeed, by 1956 it was noted that "there can be no doubt that the addition of water activated batteries to the family of power sources has brought about developments which would otherwise have been technically [\*\*711] or economically impractical." See Tenth Annual Battery Research and Development Conference, Signal Corps Engineering Laboratories, Fort Monmouth, N. J., p. 25 (1956). Also, see Finding No. 24, *165 Ct. Cl.*, at 592, 330 F.2d, at 632.

Surprisingly, the Government did not notify Adams of its changed views nor of the use to which it was putting his device, despite his repeated requests. In 1955, upon examination of a battery produced for the Government by the Burgess Company, he first learned of the Government's action. His request for compensation was denied in 1960, resulting in this suit.

[\*45] III.

#### *The Prior Art.*

The basic idea of chemical generation of electricity is, of course, quite old. Batteries trace back to the epic

383 U.S. 39, \*45; 86 S. Ct. 708, \*\*711;  
15 L. Ed. 2d 572, \*\*\*576; 1966 U.S. LEXIS 2754

discovery by the Italian scientist Volta in 1795, who found that when two dissimilar metals are placed in an electrically conductive fluid an electromotive force is set up and electricity generated. Essentially, the basic elements of a chemical battery are a pair of electrodes of different electrochemical properties and an electrolyte which is either a liquid (in "wet" batteries) or a moist paste of various substances (in the so-called "dry-cell" batteries). Various materials which may be employed as electrodes, various electrolyte possibilities and many combinations of these elements have been the object of considerable experiment for almost 175 years. See generally, Vinal, Primary Batteries (New York 1950).

At trial, the Government introduced in evidence 24 patents and treatises as representing the art as it stood in 1938, the time of the Adams invention.<sup>2</sup> Here, however, the Government has relied primarily [\*\*\*577] upon only six of these references<sup>3</sup> which we may summarize as follows.

2 The references are listed in the opinion of the Court of Claims, 165 Ct. Cl., at 590, 330 F.2d, at 631.

3 Niaudet, Elementary Treatise on Electric Batteries (Fishback translation 1880); Hayes U.S. Patent No. 282,634 (1883); Wood U.S. Patent No. 1,696,873 (1928); Codd, Practical Primary Cells (London 1929); Wensky British Patent No. 49 of 1891; and Skrivanoff British Patent No. 4,341 (1880).

The Niaudet treatise describes the Marie Davy cell invented in 1860 and De La Rue's variations on it. The battery comprises a zinc anode and a silver chloride cathode. Although it seems to have been capable of working in an electrolyte of pure water, Niaudet says the battery was of "little interest" until De La Rue used a solution of ammonium chloride as an electrolyte. Niaudet also states that "the capital advantage of this battery, [\*46] as in all where zinc with sal ammoniac [ammonium chloride solution] is used, consists in the absence of any local or internal action as long as the electric circuit is open; in other words, this battery does not work upon itself." Hayes likewise discloses the De La Rue zinc-silver chloride cell, but with certain mechanical differences designed to restrict the battery from continuing to act upon itself.

The Wood patent is relied upon by the Government as teaching the substitution of magnesium, as in the

Adams patent, for zinc. Wood's patent, issued in 1928, states: "It would seem that a relatively high voltage primary cell would be obtained by using . . . magnesium as the . . . [positive] electrode and I am aware that attempts have been made to develop such a cell. As far as I am aware, however, these have all been unsuccessful, and it has been generally accepted that magnesium could not be commercially utilized as a primary cell electrode." Wood recognized that the difficulty with magnesium electrodes is their susceptibility to chemical corrosion by the action of acid or ammonium chloride electrolytes. Wood's solution to this problem was to use a [\*\*712] "neutral electrolyte containing a strong soluble oxidizing agent adapted to reduce the rate of corrosion of the magnesium electrode on open circuit." There is no indication of its use with cuprous chloride, nor was there any indication that a magnesium battery could be water-activated.

The Codd treatise is also cited as authority for the substitution of magnesium. However, Codd simply lists magnesium in an electromotive series table, a tabulation of electrochemical substances in descending order of their relative electropositivity. He also refers to magnesium in an example designed to show that various substances are more electropositive than others, but the discussion involves a cell containing an acid which would destroy magnesium within minutes. In short, Codd indicates, by inference, only that magnesium is a theoretically [\*47] desirable electrode by virtue of its highly electropositive character. He does not teach that magnesium could be combined in a water-activated battery or that a battery using magnesium would have the properties of the Adams device. Nor does he suggest, as the Government indicates, that cuprous chloride could be substituted for silver chloride. He merely refers to the cuprous *ion* -- a generic term which includes an infinite number of copper compounds -- and in no way suggests that cuprous chloride could be employed in a battery.

[\*\*\*578] The Government then cites the Wensky patent which was issued in Great Britain in 1891. The patent relates to the use of cuprous chloride as a depolarizing agent. The specifications of his patent disclose a battery comprising zinc and copper electrodes, the cuprous chloride being added as a salt in an electrolyte solution containing zinc chloride as well. While Wensky recognized that cuprous chloride could be used in a constant-current cell, there is no indication that he taught a water-activated system or that magnesium

383 U.S. 39, \*47; 86 S. Ct. 708, \*\*712;  
15 L. Ed. 2d 572, \*\*\*578; 1966 U.S. LEXIS 2754

could be incorporated in his battery.

Finally, the Skrivanoff patent depended upon by the Government relates to a battery designed to give intermittent, as opposed to continuous, service. While the patent claims magnesium as an electrode, it specifies that the electrolyte to be used in conjunction with it must be a solution of "alcoline, chloro-chromate, or a permanganate strengthened with sulphuric acid." The cathode was a copper or carbon electrode faced with a paste of "phosphoric acid, amorphous phosphorous, metallic copper in spangles, and cuprous chloride." This paste is to be mixed with hot sulfuric acid before applying to the electrode. The Government's expert testified in trial that he had no information as to whether the cathode, as placed in the battery, would, after having been mixed with the other chemicals prescribed, actually [\*48] contain cuprous chloride. Furthermore, respondents' expert testified, without contradiction, that he had attempted to assemble a battery made in accordance with Skrivanoff's teachings, but was met first with a fire when he sought to make the cathode, and then with an explosion when he attempted to assemble the complete battery.

#### IV.

##### *The Validity of the Patent.*

[\*\*\*LEdHR4] [4]The Government challenges the validity of the Adams patent on grounds of lack of novelty under 35 U. S. C. § 102 (a) (1964 ed.) as well as obviousness under 35 U. S. C. § 103 (1964 ed.). As we have seen in *Graham v. John Deere Co.*, ante, p. 1, novelty and nonobviousness -- as well as utility -- are separate tests of patentability and all must be satisfied in a valid patent.

The Government concludes that wet batteries comprising a zinc anode and silver chloride cathode are old in the art; and that the prior art shows that magnesium may be substituted for zinc and cuprous chloride for silver chloride. [\*\*713] Hence, it argues that the "combination of magnesium and cuprous chloride in the Adams battery was not patentable because it represented either no change or an insignificant change as compared to prior battery designs." And, despite "the fact that, wholly unexpectedly, the battery showed certain valuable operating advantages over other batteries [these advantages] would certainly not justify a patent on the essentially old formula."

[\*\*\*LEdHR5] [5]There are several basic errors in the Government's position. First, the fact that the Adams battery is water-activated sets his device apart from the prior art. It is true that Claims 1 and 10, *supra*, do not mention a water electrolyte, but, as we have noted, a stated object of the invention was to provide a battery rendered serviceable by the mere addition of water. While the claims of a [\*49] patent limit the invention, and specifications cannot be utilized to expand the patent monopoly, *Burns v. Meyer*, 100 U.S. 671, 672 (1880); *McCarty v. Lehigh Valley R. Co.*, 160 U.S. 110, 116 [\*\*\*579] (1895), it is fundamental that claims are to be construed in the light of the specifications and both are to be read with a view to ascertaining the invention, *Seymour v. Osborne*, 11 Wall. 516, 547 (1871); *Scriber-Schroth Co. v. Cleveland Trust Co.*, 311 U.S. 211 (1940); *Schering Corp. v. Gilbert*, 153 F.2d 428 (1946). Taken together with the stated object of disclosing a water-activated cell, the lack of reference to any electrolyte in Claims 1 and 10 indicates that water alone could be used. Furthermore, of the 11 claims in issue, three of the narrower ones include references to specific electrolyte solutions comprising water and certain salts. The obvious implication from the absence of any mention of an electrolyte -- a necessary element in any battery -- in the other eight claims reinforces this conclusion. It is evident that respondents' present reliance upon this feature was not the afterthought of an astute patent trial lawyer. In his first contact with the Government less than a month after the patent application was filed, Adams pointed out that "no acids, alkalines or any other liquid other than plain water is used in this cell. Water does not have to be distilled. . ." Letter to Charles F. Kettering (January 7, 1942), R., pp. 415, 416. Also see his letter to the Department of Commerce (March 28, 1942), R., p. 422. The findings, approved and adopted by the Court of Claims, also fully support this conclusion.

Nor is *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327 (1945), apposite here. There the patentee had developed a rapidly drying printing ink. All that was needed to produce such an ink was a solvent which evaporated quickly upon heating. Knowing that the boiling point of a solvent is an indication of its rate of [\*50] evaporation, the patentee merely made selections from a list of solvents and their boiling points. This was no more than "selecting the last piece to put into the last opening in a jig-saw puzzle." 325 U.S., at 335. Indeed, the Government's reliance upon *Sinclair & Carroll* points

383 U.S. 39, \*50; 86 S. Ct. 708, \*\*713;  
15 L. Ed. 2d 572, \*\*\*579; 1966 U.S. LEXIS 2754

up the fallacy of the underlying premise of its case. The solvent in *Sinclair & Carroll* had no functional relation to the printing ink involved. It served only as an inert carrier. The choice of solvent was dictated by known, required properties. Here, however, the Adams battery is shown to embrace elements having an interdependent functional relationship. It begs the question, and overlooks the holding of the Commissioner and the Court of Claims, to state merely that magnesium and cuprous chloride were individually known battery components. If such a combination is novel, the issue is whether bringing them together as taught by Adams was obvious in the light of the prior art.

[\*\*714] [\*\*\*LEdHR6] [6] [\*\*\*LEdHR7] [7] We believe that the Court of Claims was correct in concluding that the Adams battery is novel. Skrivanoff disclosed the use of magnesium in an electrolyte completely different from that used in Adams. As we have mentioned, it is even open to doubt whether cuprous chloride was a functional element in Skrivanoff. In view of the unchallenged testimony that the Skrivanoff formulation was both dangerous and inoperable, it seems anomalous to suggest that it is an anticipation of Adams. An inoperable invention or one which fails to achieve its intended [\*\*\*580] result does not negative novelty. *Smith v. Snow*, 294 U.S. 1, 17 (1935). That in 1880 Skrivanoff may have been able to convince a foreign patent examiner to issue a patent on his device has little significance in the light of the foregoing.

[\*\*\*LEdHR8] [8] Nor is the Government's contention that the electrodes of Adams were mere substitutions of pre-existing battery designs supported by the prior art. If the use of magnesium [\*51] for zinc and cuprous chloride for silver chloride were merely equivalent substitutions, it would follow that the resulting device -- Adams' -- would have equivalent operating characteristics. But it does not. The court below found, and the Government apparently admits, that the Adams battery "wholly unexpectedly" has shown "certain valuable operating advantages over other batteries" while those from which it is claimed to have been copied were long ago discarded. Moreover, most of the batteries relied upon by the Government were of a completely different type designed to give intermittent power and characterized by an absence of internal action when not in use. Some provided current at voltages which declined fairly proportionately with time.<sup>4</sup> Others were so-called standard cells which, though producing a constant

voltage, were of use principally for calibration or measurement purposes. Such cells cannot be used as sources of power.<sup>5</sup> For these reasons we find no equivalency.<sup>6</sup>

4 It is interesting to note in this connection that in testing the Adams cell the Signal Corps compared it with batteries of this type. The graphical results of the comparison are shown in respondents' brief, p. 51.

5 The standard text in the art states: "The best answer to the oft-repeated question: 'How much current can I draw from my standard cell?' is 'None.'" Vinal, Primary Batteries, p. 212 (New York 1950); see also Ruben U.S. Patent No. 1,920,151 (1933).

6 In their motion to dismiss the writ of certiorari as improvidently granted, respondents asserted that the Government was estopped to claim equivalency of cuprous chloride and silver chloride. We find no merit in this contention and, therefore, deny the motion.

[\*\*\*LEdHR9] [9] [\*\*\*LEdHR10] [10] We conclude the Adams battery was also nonobvious. As we have seen, the operating characteristics of the Adams battery have been shown to have been unexpected and to have far surpassed then-existing wet batteries. Despite the fact that each of the elements of the Adams battery was well known in the prior art, to combine [\*52] them as did Adams required that a person reasonably skilled in the prior art must ignore that (1) batteries which continued to operate on an open circuit and which heated in normal use were not practical; and (2) water-activated batteries were successful only when combined with electrolytes detrimental to the use of magnesium. These long-accepted factors, when taken together, would, we believe, deter any investigation into such a combination as is used by Adams. This is not to say that one who merely finds new uses for old inventions by shutting his eyes to their prior disadvantages thereby discovers a patentable innovation. We do say, however, that known disadvantages in old devices which would [\*\*715] naturally discourage the search for new inventions may be taken into account in determining obviousness.

[\*\*\*LEdHR11] [11] Nor are these the only factors bearing on the question of obviousness. We have seen that at the time Adams perfected his invention noted experts expressed disbelief in it. Several of the same

383 U.S. 39, \*52; 86 S. Ct. 708, \*\*715;  
15 L. Ed. 2d 572, \*\*\*LEdHR11; 1966 U.S. LEXIS 2754

experts subsequently [\*\*\*581] recognized the significance of the Adams invention, some even patenting improvements on the same system. Fischbach et al., U.S. Patent No. 2,636,060 (1953). Furthermore, in a crowded art replete with a century and a half of advancement, the Patent Office found not one reference to cite against the Adams application. Against the subsequently issued improvement patents to Fischbach, *supra*, and to Chubb, U.S. Reissue Patent No. 23,883 (1954), it found but three references prior to Adams -- none of which are relied upon by the Government.

We conclude that the Adams patent is valid. The judgment of the Court of Claims is affirmed.

*It is so ordered.*

MR. JUSTICE WHITE dissents.

MR. JUSTICE FORTAS took no part in the consideration or decision of this case.

#### **REFERENCES**

Annotation References:

Amendment of judgment as affecting time for taking or prosecuting appellate review proceedings. 97 L ed 255; 21 ALR 2d 285.

Computation of time for seeking review in United States Supreme Court. 87 L ed 257.

## RELATED PROCEEDINGS APPENDIX

None.

### **BRIEF ON APPEAL**

Serial No.: 09/642,891

Atty. Dkt. No.: PHLY-25,338